COAL AGE

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We know of a mine (the owners are now on the verge of bankruptcy) that could be turned into a dividend producer by an expenditure of $600 for a modern bath and change house, near the pit mouth. Sounds like a feature story in a Sunday supplement, doesn't it?

We'll submit the facts and let you arrive at your own conclusions. We suggest, however, that if you recognize the camp and are on speaking terms with the owners, you do not overlook the truth of the proverb which teaches that "a blind man will not thank you for a looking glass."

The mine entrance is located about a mile distant from the miners' village. The effect of this is felt on rainy days, for many men would rather remain at home and lose the shift than travel through the rain and then work all day in damp clothes.

At the village, there is no water-works system and the inhabitants are dependent on a few bored wells for their water supply. This means that the men, or their wives, or their children have to carry water quite a distance, to prepare for the daily bath of the worker, when he comes from the pit. The man, or wife, or the "kid" whose inheritance is the water-carrying job, soon gets to dislike that village.

The houses which go to make up this particular camp are of uniform size; they all consist of three 12 x 15 rooms. In some of these houses, there are as many as three males, who come in at night, bringing their bank clothes with them. Aside from the dirt and the odor which they bring into the house, the sight of such clothes is not pleasing, when one is eating, playing or attempting to sleep. This means that the wife and the husband and the children and the boarders, in such houses, are not in harmony with their surroundings.

Housewives and boarding-house mistresses who spend most of their energy cleaning up and carrying water, ought to be excused if the meals they furnish do not impress the hungry man as being a "labor of love." Indifferent lunches are not aids to large outputs, if the fellow who consumes the lunch also produces the output.

Any of these circumstances, taken singly, might not mean much, but in addition to all such conditions, this particular mine has the following to contend with: The roof is bad, the coal is rather dirty and the railroad-car supply is only fair.

In spite of this adverse mining situation, however, the men could earn fair wages and the owners make a decent profit, if the houses could be kept full and the miners induced to work every day (rain or shine).

This village only requires a little boosting. If you assume that most camps have bath houses and the addition of a bath house would only put this camp on an equal footing with most of its neighbors, you are mistaken.

Now recall if you please that the carpenter's estimate for a miners' bath house was $600.

Retreating Longwall Mining Methods

By Samuel Dean*

SYNOPSIS—It is suggested that longwall mining could be successfully introduced if those operators who start such experiments would be patient and persistent. The causes of failure in several instances are recited in detail. Some remarks concerning roof support.

The description of a proposed longwall mining method by F. C. Cornet in Coal Age, July 26, 1913, has prompted this article. Mr. Cornet suggests the working of the Kittanning seam, 6 to 7 ft. thick, in panels with retreating faces 370 to 470 ft. in length, the roof to be supported at the face by three rows of props. It is stated that in this particular seam pillared areas of 100 ft. or more in width by several hundred feet in length sometimes stand open for a month with absolutely no support but the props that hold the roof slate in place. And basing his opinion on this condition, Mr. Cornet feels confident that the method of timbering (three rows of props) simple as it is, will be adequate in the working of this seam.

The proposed layout of the workings is in every way excellent, and there is not the least doubt but that it is superior to any method of room-and-pillar working. But it is doubtful if the working face can be supported by the method of timbering suggested. The upper strata of the "roof" is evidently strong, and in longwall work the goaf would probably stand open until, say 100 ft. of coal had been extracted from across the length of face, but when the first "weight" came on it is highly probable that the three rows of props would be broken, and the roof would "cave in" along the face.

Support of Roof Is Most Important Factor

In longwall-retreating the support of the roof at the working face is the most important factor to be considered. Once overcome this difficulty, and we have the ideal method of coal mining. With machines cutting across retreating faces, and the cars traveling the length of the faces, a large output is gotten from a comparatively small area of open work. The production per man is high, operations are concentrated, supervision is easy, the men in the working places receive constant attention, efficient ventilation is simple and can be maintained at a minimum cost.

In short, the benefits derived are so alluring that it is indeed surprising that more efforts are not made to estab-

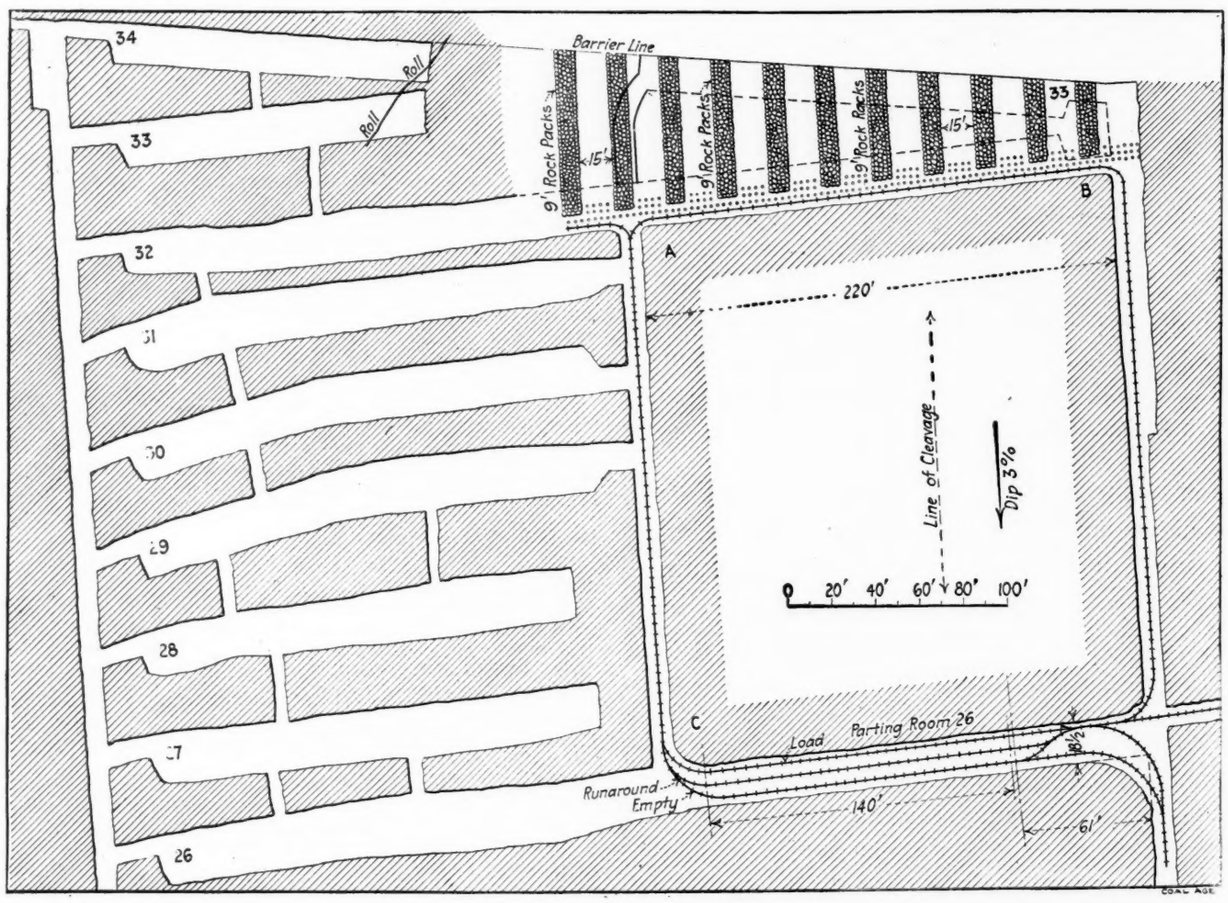


Fig. 1. Shows Method Adopted by One Company that Changed from Room-and-Pillar to the Longwall System

*The Victor-American Fuel Co., Delagua, Colo.

lish the longwall-retreating method in mines in all parts of the country. Doubtless some efforts have been made and the experiments abandoned, and further, there is no doubt that similar mistakes have been repeated time and again, principally on account of a lack of knowledge of the results of previous experiments, and perhaps by failing to benefit by the work of others. Much good can be done by giving particulars of failures in addition to supplying the results of successes.

With regard to expense or cost: The bulk of mining men believe that longwall is more expensive than the room-and-pillar method, and their experience justifies that belief. And this is all the more remarkable when we consider the facts stated by Erskine Ramsay in a paper read before the Alabama Coal Operators' Association. Mr. Ramsay spoke of a seam of coal in Wales which is 10 ft. in thickness and being worked longwall. He stated that the system employed in this particular seam was formerly room-and-pillar, and that the change to the longwall method resulted in lowering the cost of production by the substantial sum of 24c. per ton.

And this being so the question naturally occurs: If such a result can be obtained in Wales, how is it that a similar result cannot be gained elsewhere? The difficulty of answering this question would have been reduced had Mr. Ramsay supplied more particulars. But we can safely assume that the above result was not achieved in a few weeks, and probably not in a few months.

Allowing for the fact that many workmen with lifetime experiences of longwall would be available, we are compelled to assume something.

Assuming an Actual Case

Say that the seam was producing 1000 tons per day, and when the change was made it would be done gradually, a length of face or lengths of faces would be prepared, and at the start 500 tons a day would be produced by the longwall method—this is no doubt in excess of the actual production, but it will suffice for our purpose. Let us also assume that at the start and for some considerable subsequent period, the cost of longwall mining, including the cost of dead-work preparing for the change, was 25c. a ton over the room-and-pillar cost; then 500 tons at 25c. would equal $125 per day, or for a period of six months with 24 working days per month, $5500 would be spent.

After a period of six months the production would increase, until the end of 18 months the whole of the coal would be worked longwall, and during this latter period the cost would be lowered until the room-and-pillar cost was reached; then after the total period of a year and a half further development, reductions would result and the gain of 25c. per ton would be reached. Averaging the cost for the 12 months ending the period of 18 months at 12½c. per ton for 750 tons per day gives us an additional expenditure of $27,000, making a total of $32,500, the sum of which was spent before the lower cost per ton began to produce a return.

To show how quickly this sum would be recovered when the lowest cost was reached: 1000 tons per day at 24c. a ton would effect a daily saving of $240, and figuring on 24 days work per month, the saving would be $5760; in six months, $34,560 would be saved.

From the above it will be apparent that a period of over two years would elapse before any return was gained from the longwall experiment, and that during the first 18 months of that time a sum of $32,500 would be spent. If the actual figures are no worse than those given above, the managers of the mine are to be highly congratulated.

Before an owner sinks a shaft to a seam or seams of coal he generally appropriates a certain sum of money to carry out the work, and by means of boreholes and other investigations he is usually pretty certain that coal in workable thickness will be found. It would seem also that before embarking upon a longwall experiment in a room-and-pillar mine a certain sum should be appropriated, but in this case there exists a lack of certainty and much pessimism as to the outcome of the experiment. This pessimism may or may not be the fruit of previous experiments, some of which perhaps have been half-hearted. Anyway, it is certain that one single successful longwall operation in a 6-ft. seam will do more than all the articles that can be written toward promoting further efforts. Ninety-nine out of every hundred operators are doubtless waiting for that single success.

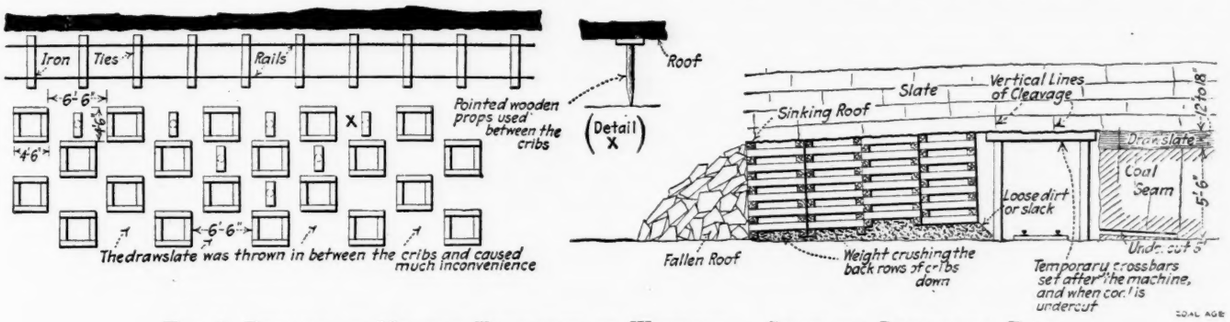


FIG. 2. DETAILS OF METHOD EMPLOYED IN WORKING A SEAM ON LONGWALL PLAN

An Abandoned Experiment

The following particulars of a longwall attempt in a 5 ft. 6-in. seam worked room-and-pillar in one of the Western states may be of value to anyone contemplating a similar experiment.

The roof was composed of 1 ft. to 18 in. of drawslate under sandstone rock, which latter varied in thickness from 3 to 6 ft. Above the sandstone was a layer of sandy shale, and continuing to the surface were alternate layers of shales and sandstones. The total cover was about 400 ft., the surface being irregular and hilly.

The first attempt was on a face 220 ft. long, from *A* to *B*, Fig. 1, the face being on the "butts" and the goaf area supported on packs 9 ft. wide, at right angles to the face, the intervening spaces or "wastes" being 15 ft. wide.

A machine undercut to a depth of 5 ft., and on account of the face advancing quickly it was found difficult to keep

up the packs which were built out of the drawslate, which came down with the coal. When the first weight came on, the fronts of the packs were 15 to 20 ft. behind the face, and this space was supported by props and cribs; the result was that the roof caved in heavily for a distance of 50 ft. about at the center of the face, the props were broken and the chocks or cribs and packs were badly crushed.

A skip 12 ft. wide was then taken across the face to open it out again, the roof being supported on the goaf side by a row of chocks 3 ft. apart. The skip was started from both ends and met about the center. A few hours after the two skips met, the roof again began to rumble near the middle of the face, and within a few minutes of the first warnings, heavy reports of breaking roof appeared to come from away up in the strata causing everyone to run hurriedly to the entries to right and left just in time to get clear of another heavy cave in along the edge of the face. Rumblings and severe sounds of cracking and falling roof continued for half an hour after the first fall.

This second collapse was most disheartening and puzzling, and one reason that might be given for it—remembering that the new roof was only 12 ft. wide supported along the edge of the fallen ground by strong chocks—is that the roof did not get full relief when the first caving in occurred.

It had been thought that by working on the butts with the lines of cleavage in the roof running at right angles to the face and going nearly perpendicularly upward, that the face-roof would be easier to hold, and that there would be a bending or cantilever action from the coal, head-on to the sinking packs behind. Before the first weight came on, some such action was noticed, but it is probable that the first layer of sandstone only was sinking and leaving the upper strata unsupported, and when this broke off, it hit the shell of sandstone roof and the first collapse occurred.

With a view of preventing this shell of sandstone from coming away, in the second attempt the chocks were built on the solid bottom which is contrary to good longwall practice, and this may or may not have been a contributory cause of the second break at the face.

A Third Attempt

A third attempt was then started, the pillars were extracted, a narrow place to afford exit was driven from *A* to *B*, leaving a 20-ft. pillar on the higher side. The roof from *A* to *C* was supported on four rows of chocks immediately behind the new face. It will be noted that this new face was at right angles to the old one, and parallel with the lines of cleavage, or "on the face." The opinion was that the sinking roof between the face and the last or back row of chocks, would lock itself (Fig. 2) and break off behind in the goaf, the back rows of chocks being withdrawn and brought ahead as the face advanced.

The chocks were built on 18-in. piles of dirt or slack, to permit the roof to sink easily and facilitate the withdrawal of back rows. All props used were pointed at the bottom, the object being that the weight would mash up the pointed ends, allow an even sinking with the chocks, prevent the props breaking in the middle and allow of their easy withdrawal.

This third attempt was successful insofar that the roof did not collapse along the face, but the handling of the drawslate which came down with the coal, the work of building and withdrawing chocks, and other deadwork, together with the machine troubles were not reduced to an economical basis and the experiment was abandoned.

The principal lesson learned is that the introduction of longwall in a room-and-pillar mine, with this thickness of coal, is costly, and that a considerable length of time must elapse to permit of room-and-pillar miners becoming familiar with, and competent in, longwall work. It was also proved that where there is 1 to 2 ft. of drawslate, the building of packs is no more costly than the use of chocks. The use of chocks is only recommended when there is nothing from which to build packs.

I want to offer my best wishes to anyone starting a longwall experiment, and any help in my power to supply.

Coal in Illinois

We give below the tonnage of the shipping mines, number of men employed and days worked for each of the coal-producing counties in Illinois, for the year ended June 30, 1913. These data refer only to the commercial mines or mines shipping coal to other than local trade.

An interesting item, in this connection, is the fact that out of a total output of $61,846,204 short tons of coal produced, 60,515,416 tons were produced by 371 shipping mines. This leaves a difference of 1,330,788 tons as produced by 469 local mines. This makes the average output for the year, for the shipping mines, 166,701 tons, as against an average output for the local mines of 2837 tons.

There were 76,855 persons employed in and around the shipping mines, as compared with 2642 persons at the local mines. The shipping mines averaged, during the year, 179 working days, as against 163 working days for the local mines. This shows the interesting fact that the shipping mines produced an average of 931.2 tons, per mine, per day, while the local mines averaged only 17.4 tons, per mine, per day. The same figures also show an average of 4.49 tons, per man, per day, for the shipping mines, while the local mines produced only 3.09 tons, per man, per day.

Counties	Total Tons, Shipping Mines	Number Men Employed	Days Worked
Bond	231,999	293	187
Bureau	1,784,688	3,647	232
Christian	1,481,737	2,026	165
Clinton	1,036,303	1,315	168
Franklin	5,232,526	5,314	209
Fulton	2,397,374	3,235	196
Gallatin	68,739	132	133
Grundy	411,964	1,096	145
Henry	4,168	17	123
Jackson	702,985	1,061	177
Jefferson	35,619	76	280
LaSalle	1,382,945	2,895	231
Livingston	28,875	63	299
Logan	411,003	591	176
Macon	279,732	548	154
Macoupin	5,202,014	4,985	200
Madison	3,832,952	4,477	169
Marion	1,188,551	1,446	197
Marshall	465,028	1,034	194
McLean	93,236	191	274
Menard	150,167	300	179
Mercer	403,466	516	169
Montgomery	2,418,329	2,629	166
Moultrie	105,280	109	224
Peoria	1,133,854	1,468	201
Perry	1,634,214	2,225	142
Putnam	752,729	1,230	250
Randolph	699,983	1,087	113
Rock Island	9,268	31	188
Saline	4,498,213	5,408	207
Sangamon	5,704,942	6,957	174
Shelby	195,569	313	158
Stark	6,753	19	149
St. Clair	4,637,552	5,572	142
Tazewell	270,783	409	255
Vermilion	3,334,623	3,831	210
Washington	244,582	377	141
White	19,246	59	126
Will	148,471	341	199
Williamson	7,685,189	9,153	179
Woodford	179,495	379	225

Two Recent Coal-Mining Disasters

By R. Dawson Hall

SYNOPSIS—The need for more safeguards against explosions. Sprinkling with a water car and loading out dust are only palliatives. With the coal dust loaded out is often a great deal of available stone dust, which would tend to prevent an explosion. Some more details relative to two recent explosions at Senghenydd, Wales, and Dawson, N. M.

The recent disasters at Senghenydd and Dawson renew the conviction that there remains much to be done before safety can be assured. The steady reduction of accidents in American mines since 1907 is this year to be turned into an increase, and the fatalities will in all probability, easily explained the 5 per cent. excess over last year's figures, but the Dawson explosion has shown that the orderly procession of accident reduction is liable at any time to be disturbed.

It is important to remember that while the Bureau of Mines has proved to almost all the bituminous coal operators that coal dust is dangerous, unfortunately that is only a part of the necessary propaganda. Equally important is it to find a cure, and almost as necessary is it to show that the water car, especially when only carried into headings, is merely a palliative and not a *remedy* for dustiness in a mine. There are many people who have not been assured that dampening a mine with steam can

The Mine and Town of the Lewis-Merthyr Collieries, Ltd., at Senghenydd, Wales, Where the Recent Explosion Occurred

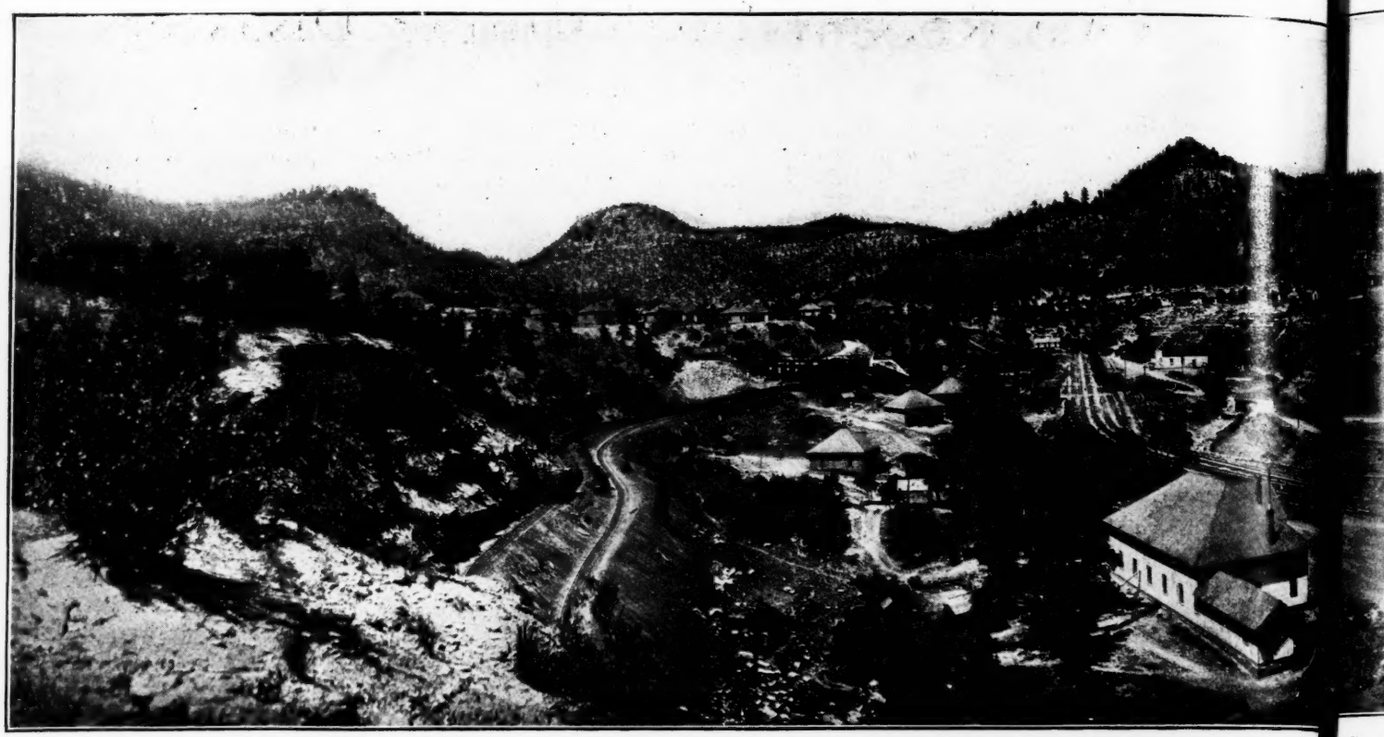
augment not only per thousand men employed, but per million tons mined.

Increase in Death Rate

The returns of the Bureau of Mines for the present year, from January to August, showed an increase of 83 deaths or 5.1 per cent. over the fatalities of the previous year. As the tonnage increase has probably been 15 per cent., a decrease in death rate per million tons mined would probably be shown for the first eight months. Unfortunately, the accident in the Dawson mine makes such a desirable reduction for the whole year almost impossible.

The steadiness with which the men have worked in the mines, and the increased number of them employed be done without adding to the danger by increasing falls. There are many operators who do not believe in systematic and extensive stone dusting as a cure for explosions, and there are also a great number who believe it may cause tuberculosis. Also few there are who know that abroad it has long passed from a scientific fad to a general practice, and that at least two manufacturers are recognizing the need for rock pulverizers in coal mines by making machinery for that express purpose.

It is these uncertainties, or lack of information, which make operators slow to adopt the right correctives. There is no question among people who are informed that moistening has never destroyed a mine roof, that shale dust spread on mine headings has never and never will cause tuberculosis, that a sufficient quantity of reasonably non-



SCENE OF THE EXPLOSION AT DAWSON MINES OF THE STAG CANYON FUEL CO.

carbonaceous stone dust will put out an explosion, and that moistening the air and stone dusting should be practiced in every mine making an explosive dust, in fact, in almost all bituminous mines.

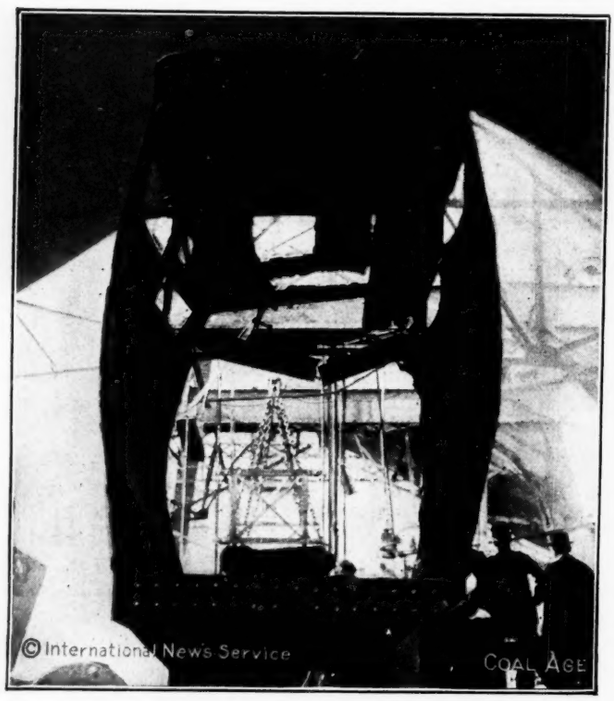
DANGERS OF THE HALF MEASURES FREQUENTLY ADVOCATED

In any mine the use of electric shot-firing from the surface, like other excellent practices, has disadvantages, because it is likely to make the men disinclined to be on their guard. They are apt to argue that at the worst an explosion will only cause a property loss.

Unfortunately, a small explosion of gas or a mine fire may easily start a larger explosion if the mine is not safeguarded against such an event. Probably at the Dawson mine the principal reliance was on loading out dust and sprinkling it with water. Even when done with all due diligence, such an action can only serve to reduce the violence of the explosion, and may remove much of the motor-braking sand and powdered roof rock by which the force of an explosion would be lessened, leaving only freshly mined coal of a most dangerous description.

Water sprinkled on dust in the mine is probably quite unequal to the task of stopping an explosion once well under way. It is chiefly valuable where the explosion starts.

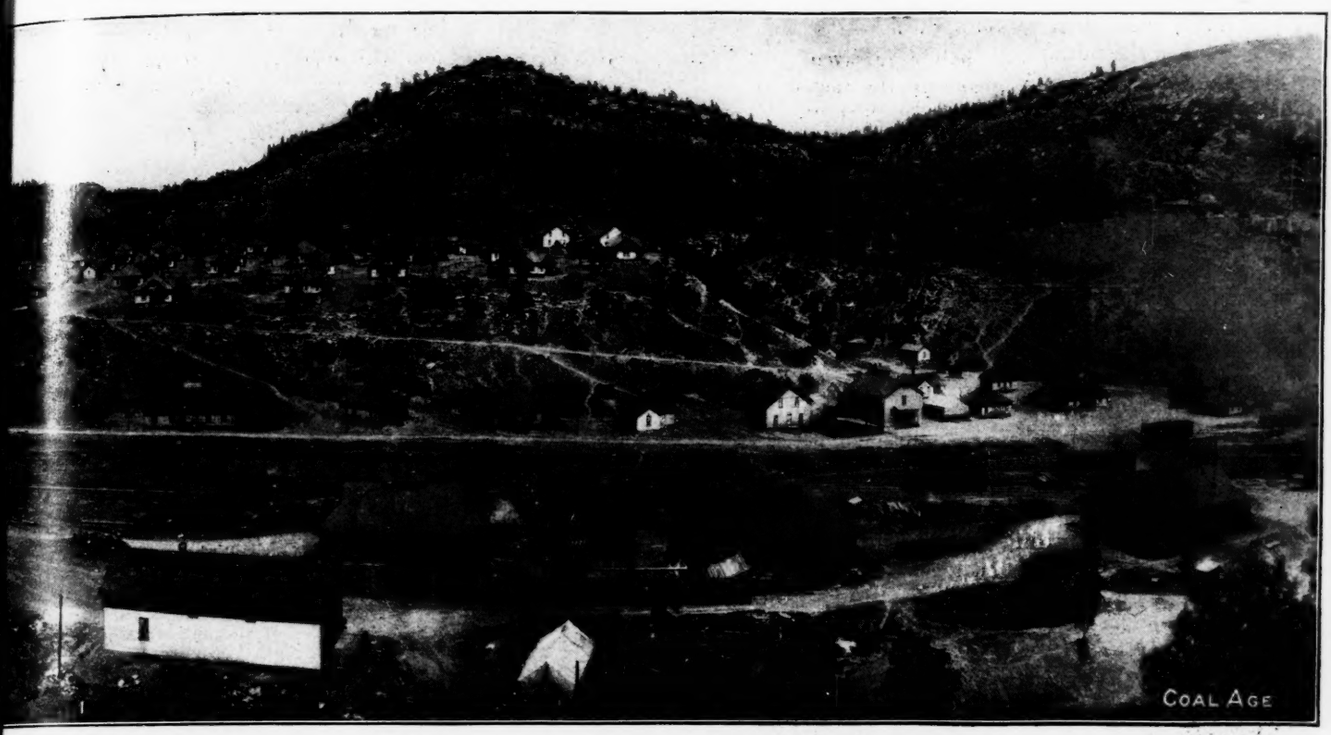
A little dust is as dangerous as a great deal, in fact it may be more dangerous, as an excess of coal dust, like an excess of methane, may render an explosion less severe. These are reasons why cleaning headings and spraying them will fail to give perfect immunity from explosions.



THE CAGE WHICH WAS BLOWN FROM THE LANCASTER SHAFT AT SENGHENYDD

SENGHENYDD EXPLOSION

The Senghenydd explosion is the worst England ha ever experienced, as far as the number of its fatalities i concerned. It is second only to that at Courrières. Th mine was known to be dangerous, for on May 24, 190 an explosion occurred by which 81 men out of 82 in th pit were killed. The recent catastrophe occurred at 8:2 a.m., the men having gone to work at 6 o'clock, and thi fact may have some relation to the cause of the acciden Most of the explosions in the United States have hap pened early in the morning and been caused by gas e ploding when a man entered a place which had not bee properly ventilated during the idle period preceding. Ac cording to the *London Times,* the hours of working we



SHOWING VALLEY OF RAIL CANYON, TRAMROADS, RAILROAD TRACKS AND HOUSES

from 6 a.m. to 2 p.m., 2 p.m. to 10 p.m. and from 10 p.m. till 6 a.m., the night or repairing shift employing only a few men. This explosion need not have resulted from a lamp; a spark from a pick would be sufficient.

The Universal Colliery at Senghenydd, Glamorganshire, Wales, was owned by the Lewis-Merthyr Consolidated Collieries Co., Ltd., Lord Merthyr being chairman. The explosion was so severe that it blew the galvanized iron roof off the head house and broke the sheaves of the downcast, or Lancaster shaft, the direction of the explosive violence apparently opposing the intake current. The head of the top cageman was cut or blown off and his assistant was seriously injured. The cage was badly damaged, as can be seen in the photograph. The Lewis-Merthyr Consolidated Collieries Co. owns seven mines and produces steam coal for the British navy. The two shafts, Lancaster and York, employ 2200 men, according to one authority and 1700 according to another.

RESCUE TEAMS AT A MINE OF THE STAG CANYON FUEL CO. DR. ROBERTS, OF THE UNITED STATES BUREAU OF MINES, INSPECTING MAPS

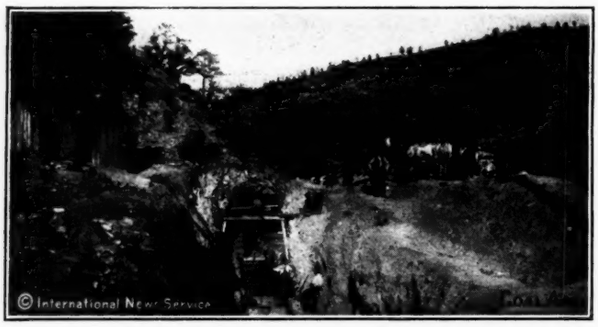
Fortunately, these men work in three shifts, and of those actually in the mines over half were saved, as they worked in the 6-ft. and 9-ft. seams in the east district, which are ventilated by a separate air current. They were brought out by the York shaft and numbered 489 men.

The Rescue Work

Edward Shaw, the general manager, at the head of a rescue party went to the bottom of the shaft. About 300 ft. in on the main haulage road he found a blazing fire, but went on nevertheless amid the smoke and fumes, only to be driven back, so blinded that he was unable to see during the remainder of the day. The fire was put out, and the rescue work proceeded slowly, but other fires were discovered, and recovery of the mine was delayed by the necessity for quenching or smothering these fires. About 18 men were rescued from the Britannic section of the mine, but no others were saved. In all 935 entered the mines in the morning and 434 were killed, including the cageman and a rescuer.

The following rules were adopted for rescue work:

1. All exploration work must, as far as is practicable, be carried on through the intake airway.



Mine at Dawson Caved In as Result of the Explosion

2. No person, except officials of the mine or responsible leaders of shifts shall enter any return airway or unventilated place.
3. When unexplored roads are about to be entered, it must be done with fresh air.
4. All roads which are unexplored must be "crossed off" for the time being.

Apparently the rescuemen appear to have had some trouble with their apparatus. "In one place," says the *Colliery Guardian* (to which we are indebted for most of this information), "nine members of a rescue brigade wearing breathing apparatus were overcome and with difficulty brought out by men not so protected."

Dawson Explosion

The number killed in the disaster at No. 2 mine of the Stag Canon Fuel Co., Dawson, N. M., is still believed to total 263 men. It is expected that the government car will continue in Dawson for two or three weeks, making a careful study of the causes. Mining work was resumed Oct. 27 in No. 4 mine, which is on the opposing side of the Rail Cañon.

The coal in Dawson No. 2 mine contains 37.93 per cent. of volatile matter, 45.08 per cent. of fixed carbon, 2.17 per cent. of moisture and 14.82 per cent. of ash. It is a highly bituminous coal. The Merthyr coals in England run about 18 per cent. volatile matter and are, therefore, only one-half as bituminous as those in Dawson. It is due to the Stag Cañon management to state that two days before the explosion, Inspector Rees H. Beddow examined the mine and declared it in good condition. The ex-territorial inspector, Jo. E. Sheridan, spoke most highly of the management.

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Recent Legal Decisions

By A. L. H. Street*

Reasonableness of Demurrage Charge—A rule of a railway company, operating in Kentucky, imposing a charge of $1 a day for detention of cars more than 48 hours, not including Sundays and holidays, after the cars have been delivered for loading or unloading is valid and enforceable (Kentucky Court of Appeals, Louisville & Nashville Railroad Co. vs. Waller & Co., 159 Southwestern Reporter 590.)

Liability of Carrier for Delay on Connecting Line and Measure of Damages—Under the Carmack Amendment to the Interstate Commerce Act, a railway company which receive a shipment of coke, or other freight, for carriage to a point in another state is liable for damages sustained by the consignee, through unreasonable delay of a connecting carrier in making delivery, of the first carrier contracted for through shipment. A clause in the bill of lading covering such a shipment, providing that, in case of loss of the shipment, its value or cost at the point of shipment shall govern settlement of the shipper's claim for damages on account of the loss, does not affect the measure of damages recoverable on account of delay in transportation. (Oklahoma Supreme Court, Ft. Smith & Western Railroad Co. vs. Awbrey & Semple, 134 Pacific Reporter 1117.)

Effect of Pennsylvania Mining Act—Although, under the laws of Pennsylvania, a miner cannot recover from his employer for injuries solely caused by the mine foreman's failure to supply props to support a mine roof, the operator is liable if it appears that the mine superintendent was notified of the foreman's failure to furnish props on request, and promised to furnish them immediately. A miner who has requested props is not guilty of contributory negligence as a matter of law in cutting and loading coal before the props are furnished, if he sounds the roof and it appears to be safe, notwithstanding the section of the Pennsylvania Mine Law which prohibits a miner from working where there is danger from loose roof or sides, until props are supplied. (Pennsylvania Supreme Court, Collins vs. Northern Anthracite Coal Co., 88 Atlantic Reporter, 75.)

Construction of Mining Leases—In construing a coal mining lease, its language should be interpreted most strongly against the grantor; and the intention of the parties is to be ascertained by reference to the entire instrument, and not to disjointed parts of it. Right to use the premises in all ways which are customary in conducting coal-mining operations is implied, in the absence of express provision to the contrary. Where adjoining tracts of land were leased to a company for the purpose of mining coal and manufacturing coke thereon, the company was entitled to construct buildings on the premises for future use of its employees, and, pending such use, could lease the buildings to another company without being required to account to the lessor for rents received on that account. (West Virginia Supreme Court of Appeals, Stonegap Colliery Co. vs. Kelly & Vickers, 79 Southeastern Reporter, 341.)

Mining Company's Liability Concerning Defective Track—In a suit by a coal miner for injury to him, sustained while handing a car on a gravity track in a mine, caused by the car jumping the track, it was improper for the court to take from the jury the question whether the mining company was negligent in failing to maintain the track in proper condition, if there was any evidence to sustain a finding of negligence, even though the weight of the evidence might seem to preponderate in favor of the company. The miner was not guilty of contributory negligence, barring recovery for the injury, merely because he knew the track was in a defective condition, unless a miner of ordinary prudence would have refused to continue work until the track should be repaired; he having received assurance that the repairs would be made promptly. (Kentucky Court of Appeals, Fusion vs. New Bell Jellico Coal Company, 159 Southwestern Reporter 619.)

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*Attorney at Law, St. Paul, Minn.

A Significant Resolution

At a meeting of the Conciliation Board held in Wilkes-Barre, the following resolution relative to the so called button strikes was adopted.

Whereas, the testimony shows that continued strikes have occurred in violation of the award of the Anthracite Coal Strike Commission and the agreements subsequent thereto, and

Whereas, new trouble has been caused by high-handed and arbitrary action on the part of certain committeemen in the forcible collection of union dues in violation of any rights given by the award or any subsequent agreement, and

Whereas, this action has caused serious loss to the G. B. Markle Co. and loss of discipline in the operation of its mines;

Therefore, be it resolved, that the company be directed to take such steps as are necessary to enforce proper discipline by the discharge from its services of the parties guilty of causing this trouble in open violation of the agreement to which they have subscribed; and

Be it further resolved, that Hugh Gallagher, Patrick Sweeney and Michael Laputka be directed to appear before this board at the next meeting, to be held Nov. 17, 1913, to explain their alleged actions in violation of the agreement and the instructions given them at the meeting held Sept. 15, 1913.

This resolution was the outcome of the complaint of the G. B. Markle Co. that since their last case relative to button strikes, heard Sept. 15, there have been several similar strikes.

❋

New Mining Legislation in Tennessee

At least two important mining bills have just been passed by the extra session of the legislature in Tennessee, September, 1913. The first of these entitled Chapter No. 24, Senate Bill 192, is:

An act to require the operators of coal mines in this state to provide and keep suitable appliances, bandages, dressings and medicines for the first aid to the injured in said mines.

The second, entitled Chapter No. 38, Senate Bill No. 191, is:

An act to provide for the organization and maintenance of a trained body of men for the preservation of lives and for rescue work in case of explosion, or other serious mine disasters, and to provide the conditions, requirements and regulations under which this organization may be formed and maintained.

The chief mine inspector, George E. Sylvester, has just sent out the following circular letter to all the mines in the state, drawing the attention of mine officials to the new legislation and its requirements:

Nashville, Tenn., Oct. 18th, 1913.

Dear Sir:

I inclose herewith amendment to the mining laws, passed at the extra session of the legislature, September, 1913. Only two of the bills, namely, those pertaining to first aid and mine rescue are, strictly speaking, mining bills. The bill relative to a two-week pay-day, although general in its character, would apply in some cases to mines and consequently has been included for your information.

The bill requiring the keeping of first-aid supplies, at mines, goes into effect at once. Many of the mines have already complied with these requirements, and I would suggest that those who have not done so give it immediate attention.

The American Red Cross and Johnson & Johnson both have on the market "Industrial Cabinets" in a neat and convenient tin box, which sells for about $6 and meets the requirements of the law. Any suitable stretcher, whether obtained from these supply people or made at the mine, will serve the purpose.

This department is very much interested in the matter of seeing these regulations carried out in all cases, and this will be a subject on which the district inspectors will report at each inspection.

Mine-Rescue Bill: As will be seen there is nothing mandatory in this bill. It is recognized by the best mining men that few, if any, mines are entirely immune from the possibilities of a disastrous mine fire or an explosion.

The value of the oxygen apparatus is also recognized in such an emergency. The maintenance of such apparatus must be considered along the line of insurance; and the object of this bill is that the state shall assist and coöperate with the mines in this matter, in order that an effective organization may be available in emergencies, and it is hoped that some of the larger mines or groups of mines will interest themselves in this matter.

The bill has the strong approval of this department, and I should be glad to take the subject up in detail with all interested parties.

Very truly yours,
GEO. E. SYLVESTER,
Chief Mine Inspector.

A third bill, entitled Chapter No. 29, House Bill No. 65, is of less importance, but applies alike to mines and other industries. It is:

An act to require all persons, corporations, companies, firms, or partnerships, to have two regular paydays each month.

❋

Coal Mining Institute of W. Va.

Between 250 and 300 of the leading coal men of West Virginia will be in Charleston, on December 8-9-10. The occasion will be the semi-annual meeting of the West Virginia Coal Mining Institute. The members of the Institute will be addressed on the first day by Governor Hatfield.

Because of the subjects to be discussed and the persons discussing them, this will be one of the most interesting meetings of the Institute for several years.

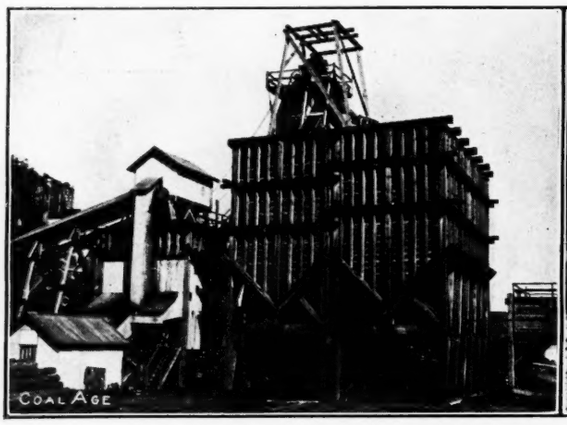
Chairman Lee Ott, of the Public Service Commission, will read a paper on the "Operation of the Workman's Compensation Law." "The Selling Price of Coal" will be discussed by R. A. Colter, of the C. G. Blake Coal & Coke Company of Cincinnati, and George F. Parker, of New York, will talk on "Public Sentiment."

The Rev. Thomas C. Johnson, of Charleston, has consented to deliver an address on the new Prohibition Law and its probable effect upon the miners of West Virginia, while former Governor Wm. A. MacCorkle will present to the Institute the result of his study of the "Effect of the Panama Canal on West Virginia Mining Operations."

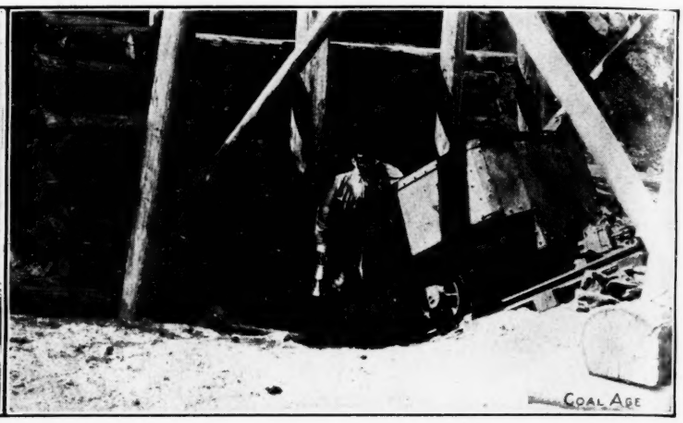
One of the foremost chemists of the country, Dr. L. C. Jones, of Syracuse, New York, will read a paper on "Chemistry of Coal as Applied to Coke Making and By-Product Ovens," while John G. Smythe, chief engineer of the Consolidation Coal Company of Fairmont, will read a paper on the use of the panel system in mining. Earl Henry, Chief of the Department of Mines, and John Laing, former Chief, will discuss the work of that department, while R. S. Ord, of Maybeury, will tell of the "Advancement of Mining Methods in West Virginia," and Frank Haas, of Fairmont, will read a paper on "General Mining Conditions."

Neil Robinson, of Charleston, is the President of the Institute, and Prof. E. N. Zern of Morgantown, is the Secretary and Treasurer. The Vice-Presidents are: George T. Watson, of Fairmont, John Laing, of Charleston, R. S. Ord, of Maybeury, J. F. Healy, of Charleston, and J. C. McKinley, of Wheeling. The members of the Executive Board are the officers and Hon. Lee Ott, of Charleston; Prof. Clement Ross Jones, of Morgantown; Daniel Howard, of Clarksburg; J. J. Lincoln, of Elkhorn; J. B. Hanford, of Morgantown, and Frank Haas, of Fairmont.

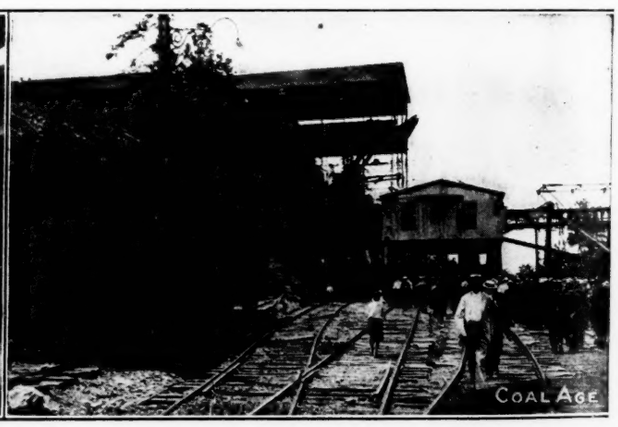
SNAP SHOTS IN COAL MINING



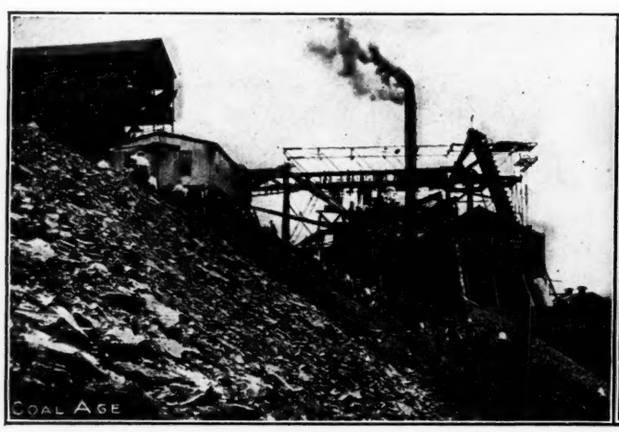
WASHERY AND BUNKERS OF WESTERN FUEL CO., AT NANAIMO, B. C.



MOUTH OF SLOPE AT NEW COAL DEVELOPMENT, COALMONT, B. C.

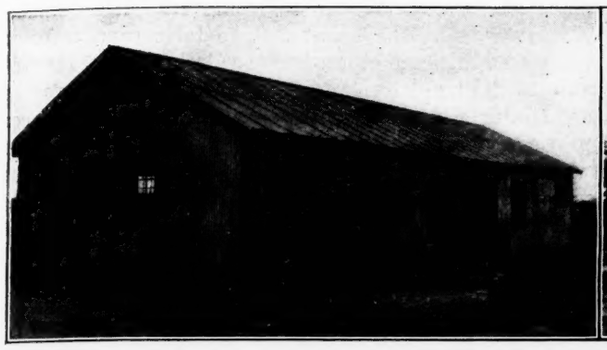


MEMBERS OF ALABAMA COAL OPERATORS' ASSOCIATION ALIGHTING FROM SPECIAL TRAIN TO INSPECT PLANT OF RODEN COAL CO., AT MARVEL, ALA.

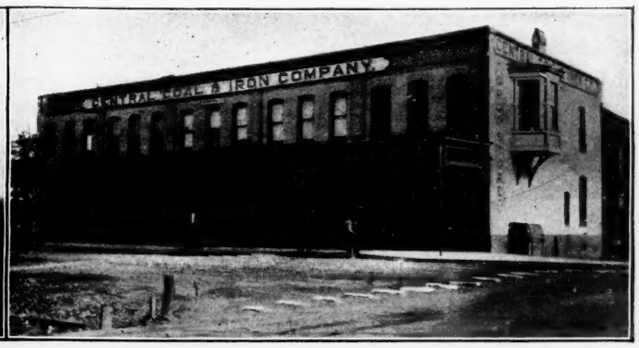


ALABAMA OPERATORS INSPECTING WASHER AND NEW TIPPLE CONSTRUCTION WORK

VIEW OF RODEN TIPPLE, SHOWING APPROACH TO DUMP AND EMPTIES DESCENDING



Miners' Bath House, Sturgis, Ky.



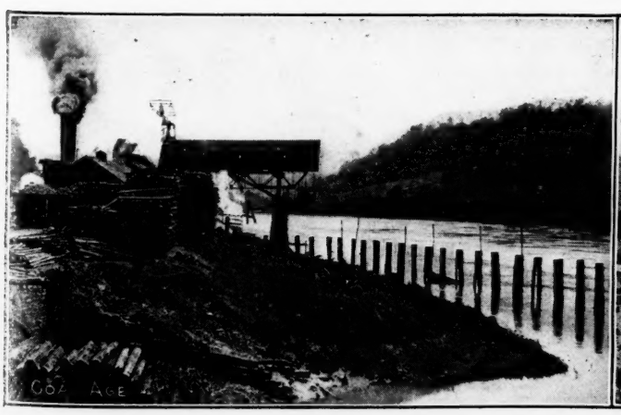
Store and Office, Central City, Ky.

Drivers and Their Mules at No. 11 Mine, Pittsburg & Cherokee Coal Co., in Kansas

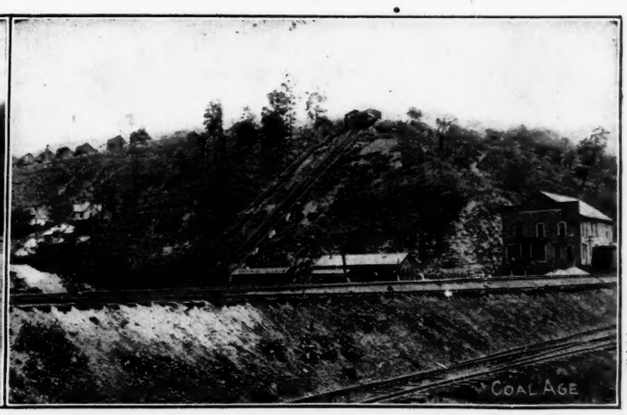
Mine No. 16 of Western Coal & Mining Co., Franklin, Kan.

Highland Mine, Providence, Ky.

Kington Coal Co., White City, Ky.



H. C. Frick Coke Co. Tipple on Monongahela River, at Gates, Penn.



Frick Coke Co. Store at Gates. Incline on Left Carries Employees

A New Coal-Washing Table

The coal wasted, both in mining and preparation for market, has in recent years been the subject of much discussion by the public press, the Government and the coal-mining industry. The latter being the most vitally interested, has directed much effort to the perfection of ways and means for reducing this waste as far as possible. No expense has been spared to provide equipment that would save a few cents a ton provided the results obtained would justify the outlay.

Among the latest coal-saving devices to make its appearance is the Massco Coal Washing Table, placed on the market by The Mine & Smelter Supply Co., of Denver, New York, El Paso, and Salt Lake City. This firm having had long and varied experience in the reduction of metal-bearing ores, turned its attention to the problem of cleaning coal, since the basic principle underlying both processes is identical.

In metal-mining parlance this process is termed "con-

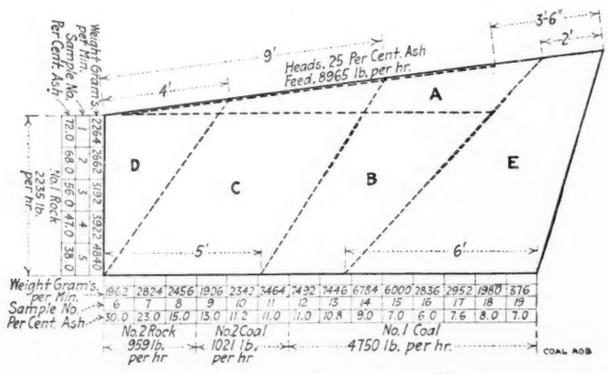


CHART SHOWING RESULT OF TEST

centration." It might with equal propriety be called "washing," which is the term generally used when applied to coal. The end sought is the same in both cases, since it is the segregation of the worthless matter from the valuable material. In ore washing this is the elimination of the gangue from the mineral, while in coal it is the separation of bone or slate, iron, sulphur, etc., from the purer fuel. This process is particularly desirable where coal is used for coking purposes in order to produce a coke with a low ash and sulphur content.

Heretofore, coal washeries have resorted to the various types of jigs for cleaning their product, and while this method accomplished the purpose on the coarser material, it was impossible to clean the fines, until the advent of this coal-washing table. This machine bids fair to displace jigs in washeries where coal is prepared for coking or is too fine for cleaning in this type of machine.

The percentage of saving effected is greater than on jigs besides producing a cleaner product. The reason for this is obvious; since the finer the material is broken the more complete is the physical separation of the coal from the foreign matter, and it only remains to segregate the good fuel from the dirt. This is the purpose for which this table was designed, and which it well accomplishes.

DIFFERENCE IN SPECIFIC GRAVITIES UTILIZED

In this apparatus, as in other coal washing machines, advantage is taken of the difference in specific gravities between coal and the ash-producing foreign substance, the latter being the heavier. The table consists essentially of a linoleum covered, riffled deck about 7 ft. wide and 16 ft. long, transversely inclined and reciprocated endwise by a head motion mechanism. The crushed coal previously mixed with about three times its volume of water is fed onto this deck through a feed-box at the upper corner.

The pulp, as the mixed coal and water is called, in its passage across the deck stratifies in accordance with the specific gravities of the different particles, the heaviest seeking the lower level between the riffles, while the coal, or lighter particles, remain on top to be washed off the side of the deck by the cross flow of water. The heavier, or high-ash particles, are guided and advanced to the end of the deck by the head motion mechanism, and discharged as waste. This separation is visible at all times while the table is in operation, and susceptible of exact adjustment and easy control of the operator. When properly adjusted, little attention is required, and one horsepower is ample to drive each table. The capacity has been found to be from 4 to 6 tons per hour on coal broken to pass a ¼-in. ring.

The accompanying line drawing shows the relative grades of coal and refuse discharged from one of these tables in use at a washery of the Stag Canon Fuel Co., at Dawson, N. M. The product of this machine is a high-grade coking slack and a superior blacksmithing coal.

Samples were taken every foot around the table, and the figures designate the relative quantities discharged with their ash content. Note that zones *B* and *E* discharge the highest grade coal, also the major portion of the product; while zone *C* is a somewhat lower grade and a lesser quantity. Zone *D* discharges practically all the waste or rock, as indicated by the high-ash content of the product. The coal used on this run was particularly difficult to wash, since the bone, coal and rock graded into each other without showing any distinct line of demarcation.

Reference to the tabulated results of the test shown below will reveal that from a table fed with material containing 25 per cent. ash, 82 per cent. of the total weight was recovered, containing 12.4 per cent. ash. While no sink and float test data are available, the 82 per cent. saving of the total would doubtless represent from 95 per cent. to 98 per cent. of the recoverable fuel.

RESULTS FROM COAL WASHING ON MASSCO COAL-WASHING TABLE, STAG CANON FUEL CO., DAWSON, N. M.

Product required for coke.....12% ash and lower
Specific gravity of Coal 1.35.....Bone and ash 1.35 to 1.85
Dry weight of feed to table, per hr.....8965 lb.
Assay of heads.....25% ash
Product from table:
No. 1 Coal 53% of weight = 4651 lb. Average ash 9%
No. 2 Coal 11.3% of weight = 986 lb. Average ash 11.5%
No. 2 Rock 10.7% of weight = 938 lb. Average ash 22%
No. 1 Rock 25% of weight = 2390 lb. Average ash 52.7%
No. 1 and No. 2 Coal combined making product:
64.3% of weight = 5637 lb. Average ash 9.5%
No. 1 and No. 2 Coal and No. 2 Rock combined making product:
75% of weight = 6575 lb. Average ash 11.3%
No. 1 and No. 2 Coal and No. 2 Rock plus 641 lb. No. 1 Rock (Sample No. 5—38% ash) making product:
82% of weight = 7187 lb. Average ash 12.4%

It should be mentioned that the above material was too fine to be treated successfully in jigs, and prior to the installation of these tables represented a total loss. A run was also made upon dump material carrying 34.5 per cent. ash, and containing 46.5 per cent. of good coal running 11.1 per cent. ash. This was first screened and that which passed a ⅜-in. mesh was fed to the table at the

rate of 7700 lb. per hr. The result of this test showed that 44.2 per cent. of the material fed to the table was recovered, containing 11.1 per cent. ash. This represented a recovery of 95 per cent. of the total amount of the commercially valuable content of the dump.

A Mine Sprinkler

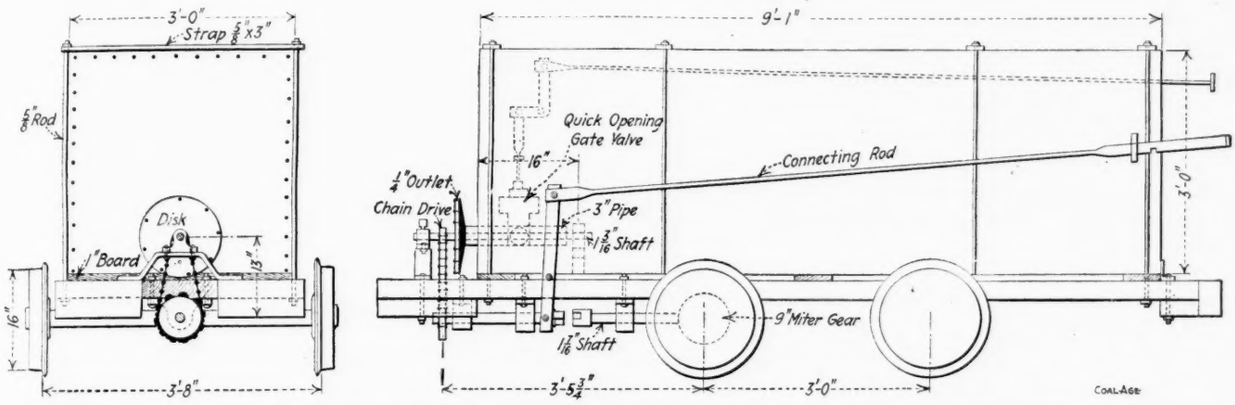
The Boardman mine washer, illustrated herewith, is not an appliance for separating refuse from coal, but a device for attaching to a water-tank car whereby the air in a mine may be purified of dust, and the floor, roof and sides effectively sprinkled, the power for the discharge being provided by the motion of the car and thus being ultimately derived from the tractive means used.

A 9-in. miter gear is provided on the rear axle of the car, this drives a shaft in the center of the underside of the tank. This shaft revolves a sprocket at the rear of the wagon and a chain passed round this sprocket actuates a bladed disk which, being fed with water, throws a continuous stream of atomized liquid in a circle, the radius of which, when its flow is unobstructed, is 25 ft.

The discharge of water can be regulated by a bell-crank from the front end of the car and, by a simple lever, the shaft connecting the rear axle with the spray disk, can be uncoupled.

Fig. 1 shows the tank car attached to a motor, but in many cases mules are used. When drawn by the latter power, the car can be taken into every part of the mine where a track is laid and to points where an explosion is likely to take place if the dust is not laid and well moistened.

Fig. 2 shows the tank car in motion and the fog it is throwing is the cause of the hazy appearance in the photo. A car which waters only the floor of a mine discharging its contents with but little force, in no sense atomizing it, may comply with the letter, but not with the spirit of the law, and protects neither the miner nor the operator. The mine washer is built by the Superior Supply Co., of Bluefield, W. Va.



A Sprinkler Which Throws a Fine Spray over Roof, Sides, Floor and Brattices

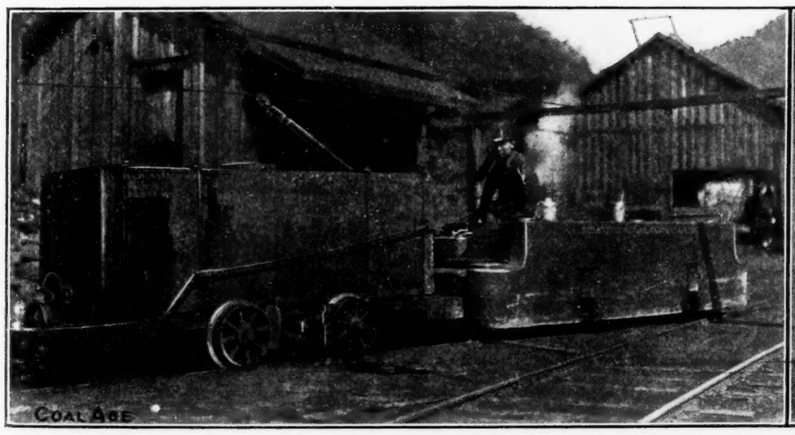


Fig. 1. The Mine Washer—At Rest

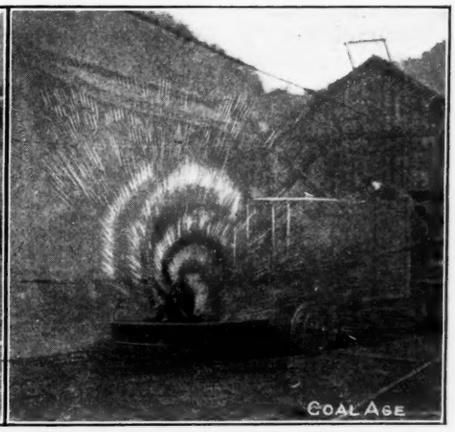


Fig. 2. Washer in Action

A Record Production

The Truesdale Colliery of the D. L. & W. Coal Co. mined, prepared and shipped to market during October, 1913, 105,020.07 tons of coal, the total production for the month being 108,220.07 tons. This tonnage is a record production from one colliery for the anthracite field. This large output may be considered remarkable indeed when it is remembered that the first ton of coal prepared at this plant was shipped to market Nov. 15, 1905, a little less than eight years ago. The plant is operated electrically, the power being obtained from the Nanticoke central station, located near the Susquehanna River

at Butzbach's Landing. The colliery is under the supervision of H. G. Davis, district superintendent; P. H. Devers, assistant district superintendent; Joseph L. Reynolds, outside foreman; W. E. Waters, William White and David M. Evans, inside foremen. The plant has a nine-hour day record of 5,729.07 tons.

A Mining Class in Alabama

Mine foreman William Crooks conducted a successful mining class of 12 members, last year, at the mines of the Pratt Consolidated Coal Co., Quinton, Ala. The membership represented different classes of mining men. Out of the eight members of the class who took the state examination at the close of the term, seven passed with credit.

The class this year has an enrollment of 18 men, among whom are two superintendents, one assistant foreman, one fireboss, a boss driver, bratticeman, trackman, timekeeper, shipping clerk, store manager. A noticeable feature is the absence of miners and mine laborers, while the interest shown by those engaged in the commercial end of the coal industry is commendable. An intimate knowledge of mining conditions and principles is always a benefit in all branches of the work—in the store, the office or the field.

Mr. Crooks this year is assisted by Supt. Hollis. The class and its teachers have the best wishes of COAL AGE.

Company Store Limits Its Profit

A company store which supplies two coal camps a mile apart in territory tributary to the Virginian Ry. is the first mercantile establishment in recorded coal-mining history to make a horizontal reduction of 8 per cent. upon everything on its shelves because it was earning too big a profit. The president of the company has laid down the dictum that "if we can't make money on coal we had better quit." The store manager has been warned that he must keep inside a certain dead line of profits.

An English Syndicate in West Virginia

There are persistent rumors of a new, big consolidation in West Virginia, regarding which the *Boston News Bureau* has the following to say:

Of interest to the security holders of New River Co. is the announcement from Richmond, Va., concerning the negotiations now in progress for the purchase by an English sydicate of important West Virginia soft-coal properties, including New River.

The proposition is said to involve an investment of $30,000,000 by English capitalists headed by Peter D. Millory, of London. The negotiations on behalf of the mine owners have been carried on by an organization known as the West Virginia Syndicate, some of the members being: W. N. Page, of Ansted, W. Va., president, who was connected with the late H. H. Rogers in constructing the Virginian Ry.; Morgan Davis, Jr., of Scranton, Penn.; Judge Alden, of New York, and G. D. Penniman, of Baltimore, representing the Baltimore & Ohio.

The properties to be acquired include nearly 100 collieries with an annual capacity of 8,000,000 to 10,000,000 tons of coal, and 550,000 acres of coal land. These plants are at present shipping annually about 4,000,000 tons and the English purchasers intend gradually to increase output to greatest possible capacity. The properties include many well known seams of coal and are estimated to contain at least 3,000,000,000 tons.

The New River Co. represents an important unit in the plan, as a producer of over 1,000,000 tons per year and capacity of double this. It has outstanding $2,500,000 5% bonds, $6,737,400 6% preferred stock, $13,474,800 common, besides $600,000 of 6% notes. The company is in good position to trade because of the noteworthy improvement which has taken place in its affairs since the Boston interests ousted the Dixon management.

Electric Light versus Candle

The danger of using lights which are extinguished by gusts of wind from shots or by rapid currents of air used for ventilation or by falls of the user is illustrated by the following accident at Roundup, Mont.:

Gustave Delannoy, a coal miner, becoming confused in the darkness, after he had "spitted" a fuse preparatory to a blast in the Republic mine, wandered back into the room and practically on top of the charge a moment before it exploded. His body, fearfully mangled, was found several hours later. It is presumed that a gust of wind extinguished Delannoy's candle after he had lighted the fuse.

The Barroom Miners

BY BERTON BRALEY

Written especially for "Coal Age."

Says Dago Tony, "I tella you what,
I maka da bigga, da greata shot!
I getta da fifteen, da twenty ton,
Da boss he say, 'O you sonna-da-gun,
No other miner so good lak you'—
Datsa what he say, I tella you true!"
"G'wan," says Mike, as he gulps his beer,
"You quit yere tossin' the bull in here,
An' listen to ME—one day last spring,
I drills my holes an' I shoots 'em, bing!
An' seventeen cars was the coal I got,
Seventeen cars from a single shot."
Then the other fellows along the bar
Begins to talk of how good they are,
They boast of the wonderful shots they've made
And the strength and labor that they've displayed,
And the barkeep filled 'em up anew
As the night wore on and the stories grew,
And the tales grew long and the tales grew wide
And the more they boasted the more they lied,
Till one of the listeners goes outside;
He goes outside with a funny grin
And after a while he comes back in
With a pick and shovel and barrow too;
Well, the gang sings out as he heaves in view,
"Say, where did ye get them tools an' truck,
An' what are they here for, me laddie buck?"
"Simple enough," he says, says he,
"I've sat here harkin all night to ye,
With all the minin' ye've done in here,
An' I says to myself, I says, 'It's clear,
I gotta get busy, upon me soul,
An' shovel out some of this barroom coal.'
Ye've drilled an' shot it in grand old style,
So now I'll shovel it out awhile!"

Well, the gang looks sheepish when this is heard
An' they never utters a single word,
But drinks their beer an' wipes the foam
An' slips out quiet an' all goes home!

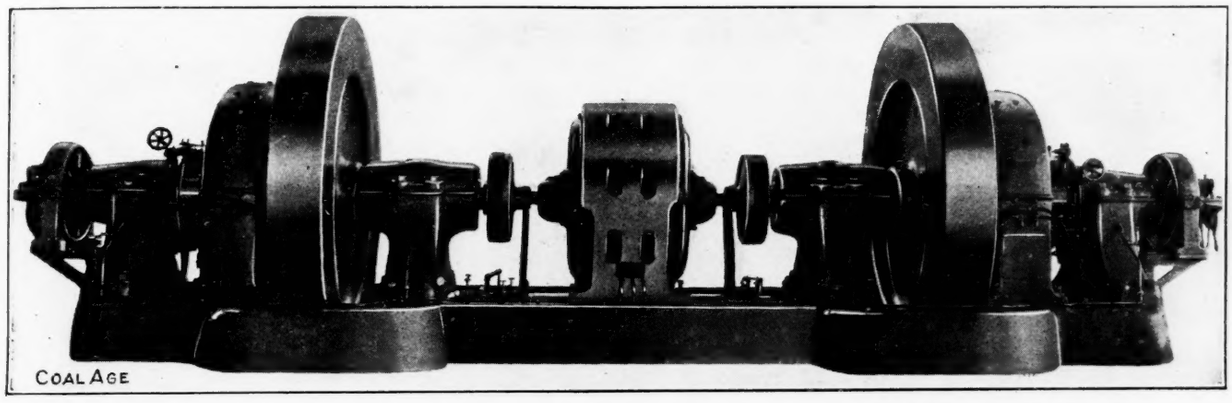
POWER DEPARTMENT

Machines for Continuous Current

By C. A. Tupper*

SYNOPSIS—Simple precautions to be observed in the installation and operation of this type of machines. This is the first of two articles upon this subject and deals exclusively with generators.

While the tendency to use alternating current for coal, coke and iron mining operations has narrowed the field of service for continuous- or "direct"-current machines, there are still many places in which these can be used to advantage, particularly for haulage or where variable speed is required, and the mine or mill superintendent who fails to give proper attention to aparatus of this class often finds himself in an awkward position. The following observations may, therefore, be of value from a practical operating standpoint.



Continuous-Current Generators with Flywheels Driven by an Induction Motor

The exact location of a generator is often arbitrarily fixed by that of apparatus already installed, but it is desirable to have the machine placed in a clean, dry and well ventilated power station away from combustible material, where plenty of light can be secured. The foundations should have enough body or mass to insure freedom from vibration. Provision should also be made for foundation bolts to hold sole plates or rails in position.

A good method of providing for these anchor bolts is to place each in a pipe at least 2 in. larger in diameter than the bolt and to arrange pockets in the foundation, so that access may be had to anchor-plate and bottom nuts. This will allow for adjustment. These bolts should be placed by templates made from blueprints of the machine furnished by the manufacturer.

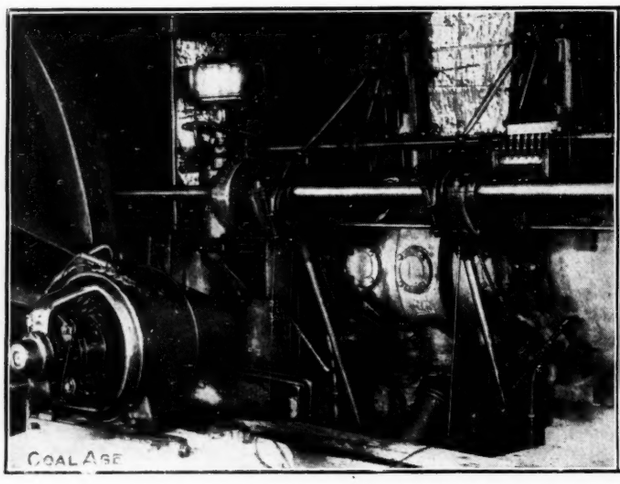
If the machine has been exposed to a low temperature, it should not be unpacked in a warm room until it has had time to warm up to the temperature of the surrounding air, or it will "sweat." The machine will gather more or less dampness during shipment and it is advisable, before putting it in commission, to bake it out thoroughly. This can be accomplished either by external heat, or by heat produced in the windings themselves.

In the former case, the apparatus should be boxed in, and sufficient heat applied to raise the temperature to about 80 deg. C. (176 deg. F.). Where heat is to be produced in the windings themselves, in case of a compound machine, short circuit the armature through the series windings, placing a meter in the circuit, and gradually increase the speed until full load current is obtained. In case of a shunt machine, separate excitation of fields will be necessary, since the armature will not give sufficient electromotive force when short circuited, to excite the fields. If the machine cannot be operated at slow speed, resistance in addition to the regular rheostat will be required.

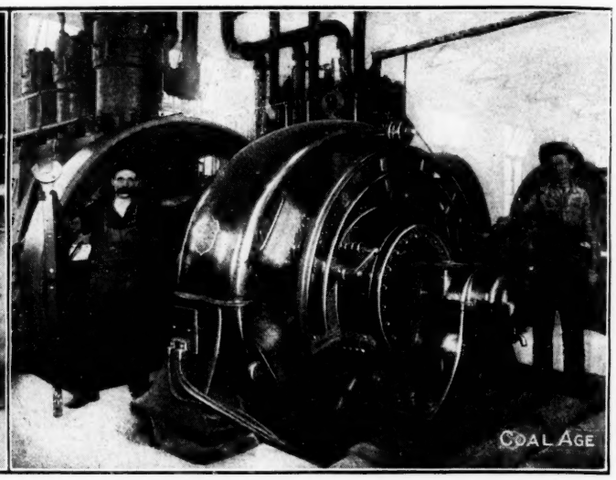
A shunt-wound generator should be run a short time at reduced speed without load, first having opened the field circuit. See that the oil in the gages is at proper level and that the rings are revolving and carrying oil. With all the field resistance in circuit, close the field switch. Gradually bring the machine up to speed and build up to normal voltage by cutting resistance out of the rheostat. Now note the operation of the machine and observe whether there is any tendency to force the armature out of its normal position. After getting the machine up to voltage and the brushes adjusted to their proper place, close the circuit breaker, then the main switch, and throw on the load. The voltage will drop as the load comes on, and the field will have to be adjusted to give proper voltage.

In case the generator does not build up to voltage when the field circuit is closed, as above explained, it will be found that either the machine has lost its residual magnetism, or that field coils are wrongly connected to the armature leads. In the former case, separately excite the fields from some other source of power for a few minutes. If, on reconnecting the fields, the generator does not build up, it is probable that the field coils are wrongly

*Cleveland, Ohio.



D.C. Generator Belted to Large Gas Engine



D.C. Generator Driven by Diesel Coal-Tar Engine

connected to the armature. In this case reverse the armature leads.

Precautions for Compound-Wound Machines

Take the same precautions in starting as stated for shunt-wound generators. When running at full speed and normal voltage, throw on the load, closing the circuit-breaker first, followed by the main switch. Note particularly whether the voltage drops to any great extent as the load increases; if so, the series coils are opposing the shunt and should be reversed.

Series shunts are usually provided with compound-wound machines, and these should be adjusted to give the exact compounding effect required, with the machine operating under normal conditions.

For parallel operation of the direct-current generators, assume that machine *A* is loaded and that machine *B* is to be placed in parallel. Bring machine *B* up to equal voltage; and, first noting that its polarity is the same as that of *A*, close the main switch. Then cut resistance out of the field of *B*, raising its voltage slightly and causing it to take more load. Since the voltage of a shunt machine varies with the load, it will be necessary to adjust the fields of both *A* and *B* to make them divide the load, and give proper terminal voltage.

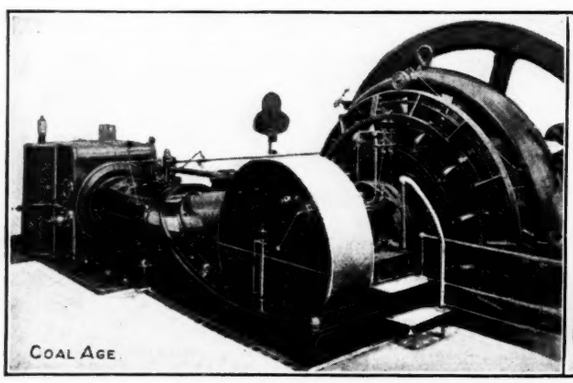
If the polarity of the machine, as connected with the switchboard, is opposite to that of busbars and it is desired to reverse this without changing cables, it can be accomplished by reversing the residual magnetism of the machine. When the residual magnetism is reversed, the machine will build up with opposite polarity. This may be accomplished as follows:

Remove all brushes from the holders and close the main switch for a few moments; then slowly open. By this means current will be forced through the fields from the busbars in a direction opposite from that when self-excited, and will reverse the residual magnetism. Again, this can be accomplished by removing the armature wire from the lower jaw of the main switch. The fields will then be excited in the same manner as above. This latter method is the more simple, and is to be recommended.

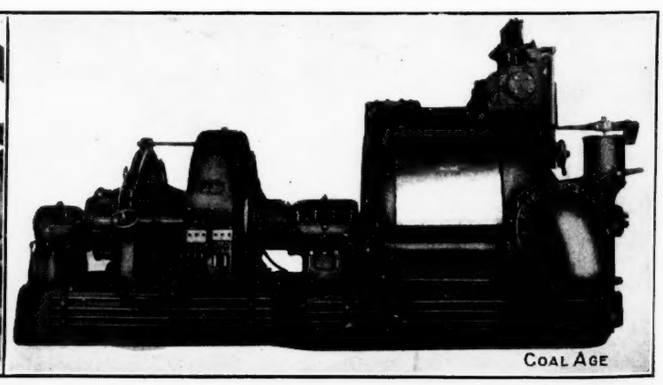
To take the load off machine *B*, gradually cut the resistance of the rheostat in circuit, thus shifting more load onto machine *A*. It will then be necessary to adjust the fields on machine *A* to bring the voltage back to normal. When the ammeter on machine *B* reads practically zero, trip its circuit-breaker and open the main switch. Cut all the resistance of the rheostat in circuit and shut down the generator.

Compound-Wound Machines in Parallel

The operation of compound-wound generators in parallel is slightly more complicated than that of shunt machines, since an additional connection between the machines is required. This connection is made at the beginning of the series winding; that is, where the armature cable is conected to the series coils, and is called



A D.C. Generator Coupled to a Corliss Engine



D.C. Generator Coupled to a Steam Turbine

an equalizer main. In large central coal-mine power stations equalizer switches are placed near the machines on a special post, while in smaller plants a three-pole switch is provided on the switchboard. See that the equalizer mains are as short as possible, with plenty of cross-section, and never smaller than the armature mains.

As a first step toward operating two such machines in parallel, each should be operated under normal load, and its series shunt adjusted to give the compounding effect desired. If the machines are of the same size and make, they can be thrown together, and further slight adjustments made to their series shunts to make them properly divide the load. It might here be mentioned that the lead given the brushes somewhat changes the compounding effect of series windings. It is, therefore, necessary that the machines to be operated in parallel have their brushes set with approximately the same lead.

With machines of different size or make, it is necessary, in addition to the above, to obtain equal drop in voltage across the series winding and the cable connecting to the switchboard, when each machine is carrying its portion of the total load. In other words, the drop between equalizer main and busbar of the same polarity must be the same for each machine. If this is not the case, resistance must be added to the cable connecting the machine to its busbar.

In putting machine *B* in parallel with machine *A*, which is now loaded, bring *B* up to the same voltage and see that it has the same polarity as *A*. First close the equalizer switch, then the circuit breaker and finally the main switch. Gradually cut the resistance of rheostat *B* out of circuit, thus causing *B* to take more load. If the voltage is not at the proper point, adjust the fields of both *A* and *B* to obtain correct voltage.

If a single-pole circuit-breaker is used, see that it is placed in the main of opposite polarity from the equalizer side; that is, if the positive cable from the armature is connected to the series winding, then the circuit breaker must be placed in the negative main. The ammeter should be connected in the same lead as the circuit-breaker.

A necessary precedent to the successful starting and operation of direct-current generators is, of course, their careful installation; but the above has been given out of its proper order for the reason that, with these facts in mind, the following details will be better comprehended.

General Directions for Installing Machines

Few exact directions can be given for the erection of large direct-current generators, owing to the diversity of size and shape and the varying facilities for handling machines found at different coal mines or coking plants.

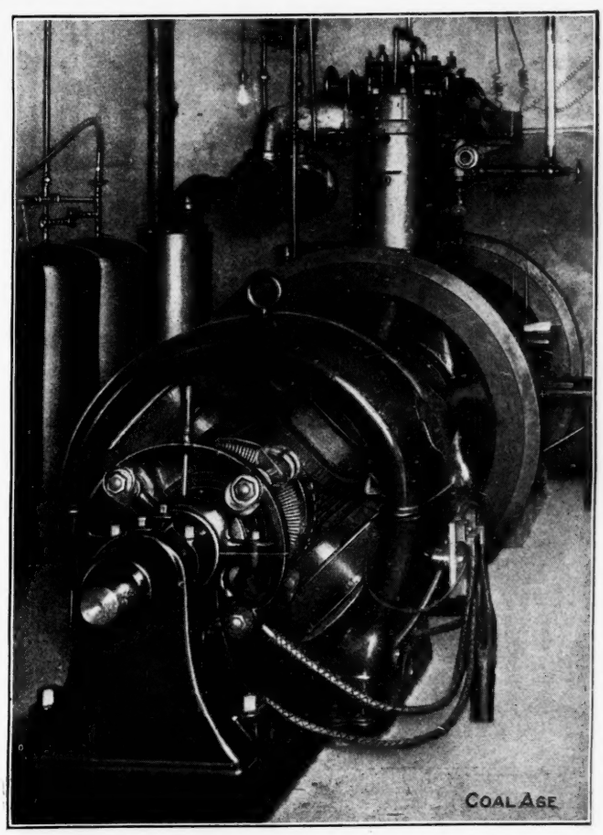
Most machines are shipped by the manufacturers with the field coils and poles assembled on the yoke. It is usual also, in order to facilitate shipping and handling, to have the yoke separated into two parts, and in the suggestions given below this will be assumed. The revolving armature, with its commutator, is always skidded separately, with suitable protection, and the other parts shipped as convenient.

A foundation having been prepared, as above indicated, and the machine received at the power house of the mine in complete condition for assembling, the following instructions apply to any standard make. Belted machines, adjustable on rails, will be first considered.

To start with, the rails should be temporarily placed and approximately leveled, then the base placed upon and bolted to them. Be extremely careful that the rails are wedged up, so that the weight of the base will be distributed evenly.

Then set the lower half of the field yoke in position, bolting it down and placing the dowel pins.

Next get the armature in position, being extremely careful not to scratch the bearing surfaces of the shaft, or in any way to bruise or injure commutator or windings. Handle the armature with a rope sling, protecting windings and commutator by a spreader. See that all oil wells and bearings are carefully cleaned, and all bearing surfaces covered with oil before placing the armature in its final position.



Continuous-Current Generator Connected to a Gas Engine

Set the top half of the field yoke in position, seeing that it is properly placed with relation to bottom half, and that all contact surfaces are clean.

Carefully level the machine and line up the driving pulley. If possible, turn the machine over in this condition with the belt not pulled up tight, and adjust while running, so that the belt runs to center of pulley and does not force the armature out of its central position, but leaves it free to oscillate in its bearings.

Tighten down the foundation bolts and grout in the rails. For this purpose a mixture of the following proportions may be used: One part portland cement with one part fine sand, mixed with sufficient water to obtain a thin consistency. Pour this under and around the rails, limiting the surface over which it spreads by a small

clay dam. When the cement has partly set, remove all surplus and smooth up the joint under the rails.

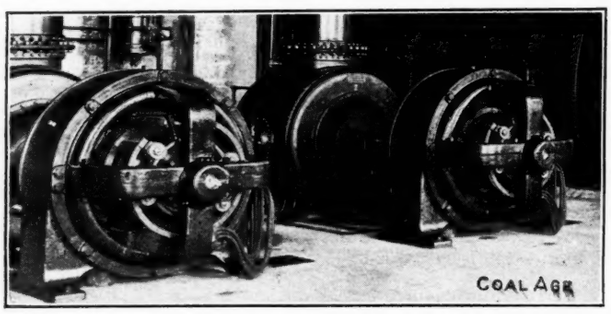
Setting Engine-Type Machines

Engine-type machines are, of course, not supplied with base or bearings, the engine shaft being extended to carry the armature, while the yoke is supported on the engine base, or on sole plates set on the engine foundations. Hence the following directions apply.

First set the sole plates temporarily in position, supporting them on iron wedges to allow for further adjustment.

Place the lower half of the yoke in position, inserting shims to a thickness of ¼ in., to allow for adjustment as the engine bearings wear down.

Locate the armature and the engine shaft in their bearings, observing the precautions in handling mentioned in connection with belted machines. In case the engine shaft has not been pressed into the armature spider, and it becomes necessary to do this work on the



D.C. Generators Direct Connected to Hydraulic Turbines

ground, an expert mechanic should be employed for the purpose.

Place the top half of the yoke in position, cleaning all contact surfaces carefully. In aligning the yoke to the armature, see that the air gap is symmetrical at all points, and that the center of the laminated iron of the armature is in line with the center of the pole laminations. Failure to do this will put an undue strain on the shaft or give a side thrust. Leveling screws, when provided in the feet of the yoke, are a great help in aligning. Do not, however, leave the weight of the machine on any such screws, but insert shims. When the yoke has been bolted permanently in place, all leveling screws should stand free.

"Grout in" sole plates as previously explained. When the grout has set, tighten the foundation bolts and then carefully check over the alignment of the machine.

See that the series leads and clamping plates are carefully cleaned and securely bolted together, also that all contact surfaces of current-carrying members, such as armature-lead terminals, terminal plates, etc., are carefully cleaned and fitted together.

Concerning Brush-Holders and Rocker-Arms

Assemble the brush-holders on the rocker-arm and stagger them on one stud with respect to the holders on the next, in such a manner that the brushes will not follow the same path on the commutator. Set the brush-holders so that they clear the commutator, approximately ⅛ in. After the holders have been carefully set with the jig they should then be checked off to see if equal numbers of bars come between the different studs; if not, the distance from commutator to holders should be changed to obtain equal spacing of brushes. Holders should always be placed so that the commutator rotates against the brushes, tending to force them away from the holders.

The brushes should be carefully fitted to the commutator, first using coarse sand or garnet paper and finishing with fine sandpaper. While grinding in the brushes, hold the paper down on the commutator so as not to wear away the edge of the brush. Remove each brush from the holder and see that the entire surface of the brush is fitted to the commutator. Make sure that the finger presses squarely on the brush and does not have a tendency to push the brush out of line.

The finger should also give the proper amount of pressure on the brush; this can be easily adjusted by moving the tension spring on the holder. The proper amount of pressure can only be obtained by good judgment and careful attention to the special case in hand, as too little pressure will result in sparking, while too great pressure means excessive wear of the commutator and brushes.

See that the oil wells of the bearings are thoroughly cleaned and filled with a good grade of mineral oil to a level that will insure the rings carrying up the lubricant. Take care that oil-well covers are in place, so that dirt and foreign matter may be kept out of wells.

In all wiring at the power plant, as well as in a mine, special attention should be paid to the mechanical execution of the work. Careful and neat running, connecting, soldering and taping of conductors, securing and attaching of fittings are especially conducive to security and efficiency. Wire of an approved insulation must be used, and a cross-section sufficiently large for a liberal increase in load without injury to insulation should be provided.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

The Scranton District Mining Institute will hold its annual dinner in the Town Hall at Scranton on the evening of Nov. 29. It is reported that upward of 1200 banquet tickets have already been sold. J. H. Dague, of Scranton, is president.

An International Exposition on Safety and Sanitation will be held Dec. 11 to 20, at the Grand Central Palace, under the auspices of the American Museum of Safety. Dr. Tolman, of 29 West 39th St., New York City, is director general of the exposition.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whitesides, Denver, Colo., is secretary.

Illinois Mining Institute will hold its next regular meeting in East St. Louis, Nov. 22, beginning at 9:30 a.m.; two sessions will be held, morning and afternoon. All who are interested in mining are invited. Applications for membership can be had by writing the Secretary-Treasurer, Martin Burt, 1526 So. College St., Springfield, Ill. Headquarters will be at the Illmo Hotel. Meetings will be held in the City Hall.

EDITORIALS

What a close study of conditions is able to do in increasing the efficiency of the individual worker is shown by the numerous reports published from time to time, and which reveal a great advance in the matter of scientific management. An eastern machine shop increased its output 25 per cent., in a single department, and lowered the cost of labor from 10 to 20 per cent., while at the same time the wages were increased 25 per cent. This is an example of what an intelligent study of conditions can do to increase industrial efficiency.

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Many coal operators are looking forward with apprehension to a possible war with Mexico. Even the Balkan wars caused a temporary exodus of laborers from various coal camps, and trouble such as would result from an invasion of Mexico would seriously hurt the coal industry, which at the present time is experiencing a shortage of labor in many fields. The coal mines of West Virginia, for instance, are badly in need of men, the operators there claiming that they could use from ten to fifteen thousand miners in jobs that will pay from $80 to $180 a month.

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Removal of Tariff on Coal

The new tariff places coal and coke on the free list. Anthracite was already free from all protection. The change, therefore, affects only our bituminous product. We do not apprehend that disaster, in a commercial sense, will come to any of our coal-producing companies because of the removal of tariff.

We need never fear that European coal owners will successfully enter our local markets. The only competition of a serious nature is that from Nova Scotia and British Columbia in Canada. The Nova Scotia mines are producing about 7,000,000 tons annually. The coal is similar to that mined in northern West Virginia. It is largely consumed in eastern Canada, and now practically controls the market offered by the St. Lawrence ports. However, some of this coal finds its way into New England, and with all tariff removed, it is probable American consumers along our North Atlantic coast will use more of the Canadian fuel.

The output of the Nova Scotia field, however, is limited, the area of the entire district is not as large as any one of the important fields in our Eastern States. Practically all of the American coal that now seeks a market in New England is superior to Nova Scotia fuel, so that, so far as quality is concerned, the advantage lies with the American operator. It is, therefore, purely a question of transportation rates, with most of the advantage now favoring the Canadian producer, offset by the greater desirability of American coal for fuel purposes.

In Montana and Wyoming the situation is slightly more serious. Coal in the Crow's Nest field of British Columbia is not only equal, but is superior in many ways to our Montana and Wyoming lignites. The British Columbia field is quite extensive and can provide a considerably larger output if a market can be found. There is no doubt but that Canadian coal will prove a strong competitor in our Northwestern States. We feel confident, however, that American operators can produce at a cost as low, or lower, than their competitors across the line, and we predict that whatever change in the markets occurs will be only temporary and certainly not fatal.

Of course, it would be easy for the owners of American coal mines, in those districts where Canadian competition is a fact, to follow the usual procedure and predict financial ruin as a consequence of placing coal on the free list. But such a course has not been pursued, and our operators are preparing to retain their markets through an exercise of superior commercial and technical sagacity.

If free trade in coal and coke is beneficial to the United States as a whole, it is certain to be ultimately helpful to the fuel industries, even though it may be temporarily disconcerting. Any business that must needs exist at a sacrifice of the common good has been built on an insecure foundation. It would be well if each man engaged in any one of our great American industries ceased to believe that he alone should be handed a life preserver, while everyone else is obliged to swim ashore unaided.

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Incorporating the Labor Trust

Secretary W. B. Wilson, speaking before the American Mining Congress, stated that he was opposed to the incorporation of labor unions. It was unreasonable, he said, to compel operators to run their mines by force of law when there was no profit obtainable or no market for their coal. That being the case, it would be wrong to incorporate the unions and make them liable for the abstention of men from work after an agreement had been signed.

But Mr. Wilson did not conceive that the *purpose* of a failure to comply with the agreement might, without injustice, receive juridical consideration. There is no crime committed when an operator decides to close his mines if his reason for his action is that the loss in operation is excessive and can no longer be sustained, or if individually he desires to sell his coal at a higher price and refuses to enter a sacrifice market, or if he can buy better coal elsewhere as cheaply or at less cost. He has always done this at his pleasure and nothing in the agreement abridges this right. But he has no warrant for shutting down his mines in order to compel the working man to accept any modification of the wage scale. He is bound by his agreement to pay the rates agreed whenever he operates his mine.

Similarly the working man has never been denied in America the right to hire himself to the highest bidder, to sell his labor where he will, to travel to other fields or to hunt a new job. These are his rights but when the men in a union stop work to make some coworker join the organization, or pay his dues, or wear the union button when the agreement clearly calls for an open shop, then we have the working man not seeking to maintain his

right but endeavoring to violate an agreement to which he has signed his name directly or by proxy.

Of course, it is true that members of unions have repeatedly done this; the charge is not denied. We think it could have been *proved* to the satisfaction of the law courts, not once, but many times since the last anthracite agreement was signed. Suddenly 700 men apparently decide they cannot live on the wage paid them, for three or four days they all agree to hunt for other jobs in a town where no other jobs are obtainable and they do not move out to look for work elsewhere. At their meetings they declare the suspension is inaugurated to make certain men pay union dues. After a few days' idleness, those dues are paid and the men go back to work. Does any sane man, except perhaps a member of the President's cabinet, believe or pretend to believe that the 700 men quit work because they did not want to live on the wage agreement and so were looking for another job? Why, even a jury could not be made to believe that.

And if their purpose is to destroy the force of their signed agreement; then it is a pity they are not incorporated so that they can be sued. The working man should be as finical as his employer about making good his agreements and if he is not, the law should rectify his lack of moral responsibility. Occasionally, in some coal regions, the employer is disposed to break the agreement for his own personal advantage and it is a pity that, as the contract has merely a moral value, such an operator cannot be made financially responsible for such a violation of his plighted word.

The Firedamp Whistle

Word comes from Germany that a new "firedamp whistle" has just been invented by Privy-Councilor Haber and Dr. Oeiser, as a result of the appeal of the Emperor, made a year ago, that an attempt should be made to discover some means of preventing mine catastrophes due to the explosion of firedamp.

The device just exhibited to the Kaiser and which has met with his approval consists of a metallic cylinder 10 in. long and 2½ in. in diameter, operated by means of an air pump. The sound of the whistle is said to be audible 300 ft. away. When blown in pure air, the whistle gives an even tone; but when blown in air charged with marsh gas, the tone is said to vary from a shrill tremolo to a jerky staccato, depending on the percentage of gas present.

It seems strange that this device should be described as something new. It appears to be a resurrection of the old Forbes gas indicator, invented by Prof. Forbes more than half a century ago, but found to be of no practical application as a means of detecting gas in mines. The principle of the device depends on the difference in the length of the sound waves, in air of different densities. But, since the density of the mine air may vary as the result of a number of causes other than the presence of gas, no reliance can be placed on the indications for gas, as given by the tone of the whistle.

The Forbes indicator differed from the present device, in that a tuning fork of 512 vibrations per second was fixed in the mouth of a brass tube 6 in. long and 3 in. in diameter. The tube was fitted with a tightly fitting movable piston, the position of which was indicated by the movement of a pointer on a scale graduated to indicate percentages of gas present in the air. The zero of the scale corresponded to that position of the piston that produced a maximum resonance of the tuning fork in pure air. When testing for gas, the piston had to be moved until the tuning fork gave the same maximum resonance which varied with the density of the air, for a like position of the piston. In this device a thermometer was attached to the instrument to make the necessary correction for the temperature of the air, as this would vary the density and the tone of the fork. The idea has long been abandoned as useless in its adaptation to mining conditions.

Passing of the Small Dealer

Compelling influences are slowly but surely revolutionizing the marketing of coal in the large consuming centers. The small independent unit, as in other lines of endeavor, is giving way to the large consolidation with its trained selling and technical experts, its unlimited tonnages and other accoutrements of enormous capital.

Marketing coal on a small scale is no longer an economically sound enterprise. Elaborate equipment involving costly machinery has effected such economies that dealers not equipped with modern facilities, find themselves at a serious disadvantage. Not only are they unable to effect an economical distribution of the product, but they are not prepared to meet the occasional heavy emergency demand.

The advent of the large hopper-bottom steel cars, or as they are commonly called, "battleships," may be taken as a typical example of the trend of conditions. The proportion of this kind of equipment is steadily increasing and it is only a question of a relatively short time when the "battleship" will have practically displaced the old-style gondola. The heavy additional expense of unloading these latter when the consignee had no trestles is too obvious to require comment.

In addition to this the net profit per ton is too small with the individual unit who handles but little to make the business lucrative. The large automobile truck with its capacity closely approaching that of the smaller railroad cars, is also becoming an important factor in the situation, while liability to loss due to bad debts or slow payment must be considered here, even more than in other lines of business.

Safety First?

It has been rather pertinently suggested that the time-worn adage "Safety First" be supplemented by one of "Discipline First." The idea is one that will probably commend itself to many coal engineers. While revolutionary in character, it offers a more tangible basis for procedure and there are many who will, no doubt, believe that it is an attack at the real root of the trouble.

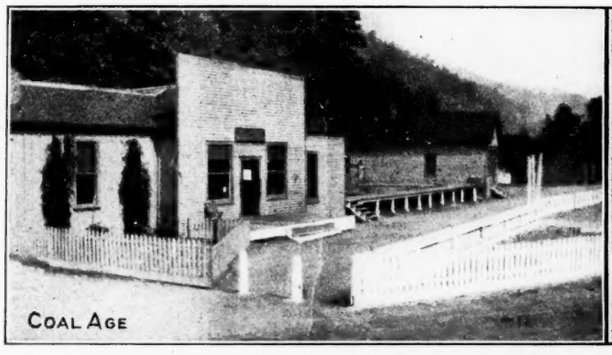
Of the total fatalities, both inside and outside of the mines, it is well known that nearly half of these are due to falls of various kinds. Is it not a fact that one of the most rigid rules at all mines is that timbering must be kept up to the face so that every place will be safe? It is clear, therefore, that we have a single case (and one which is responsible for half of our total fatalities) in which the trouble is either directly or indirectly a violation of rules.

SOCIOLOGICAL DEPARTMENT

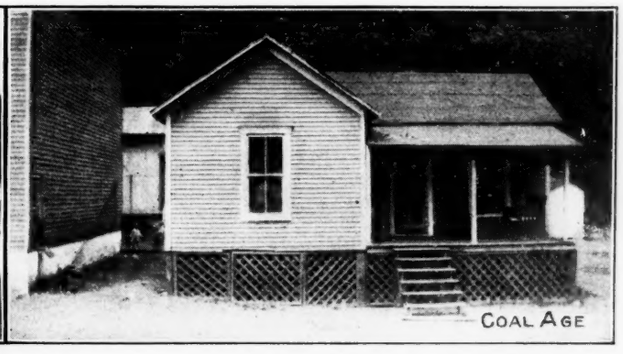
The Cabin Creek Y. M. C. A., Decota, W. Va.

(Special Correspondence)

The coal-mining town of Decota, W. Va., is situated at the junction of two small streams that form together Cabin Creek proper. The village is about 16 miles from Cabin Creek Junction, at which point the creek empties into the Kanawha River. The steep and high hills on either side of the narrow valley of the creek and its branches contain several seams of coal of workable thickness. About a dozen years ago, coal operators began to work these extensive beds of fuel. At one time upwards of 20 different companies were located along the creek. A few years ago 11 of these corporations combined to form the Cabin Creek Consolidated Coal Co., and four others combined under the sales agency of the Carbon Fuel Co. This combination as will be easily seen effects a great economy of administration and operation. Probably no operating coal companies in the country are better organized for conducting the business along modern lines than the Carbon Fuel Co., with J. R. Thomas as president and C. A. Cabell as general manager, and the Cabin Creek Consolidated Coal Co. with M. T. Davis as president and Ira F. Davis as general manager. Their accounting system is a marvel of simplicity and accuracy.



The Old Saloon Now a Y. M. C. A. and on the Right, the Hall for Moving Pictures



Residence of the Decota Secretary of the Young Men's Christian Association

Capitalizing Crime

From their early history these companies took an active interest in the welfare of their employees. At one time there was a tract of 37 acres of land adjoining theirs which belonged to a private party but was of little value as it contained no coal and was unproductive for tillage. However, it was a great revenue producer for the owners as it contained a saloon which did a business far more profitable than any coal mine. It was a poor day indeed that it did not do a business of $300, and on one occasion at least it took in $2160 in a single day.

The companies felt that this saloon was a menace and a liability to the community, so they bought the property for the sum of $42,000, a price unheard of for similar land anywhere in the state. On gaining possession the saloon was closed, and although the new owners were offered the sum of $700 per month for the saloon privilege, it is to their credit that the offer was flatly refused.

The saloon was surrounded by a tight board fence 7 ft. high and on paydays the inclosure would be filled with the forms of miners in a state of helpless intoxication. On recovery, if they had any cash left the process would be repeated. Gambling and fighting were the order of the day for those who were sober enough to participate in such exciting amusements. Often it was three or four days after payday before there were a sufficient number of men able to work to run the mines at anything like a normal capacity.

But the closing of the saloon was only half the battle. The railway trains brought in large quantities of liquor. The great need for a substitute for the saloon became more and more apparent. Men in such communities have more or less leisure time on their hands as there are often days when on account of a car shortage or other reason the mines are idle. With men of small resources under such circumstances the most natural use of this time is in dissipation unless there is some healthful form of amusement provided.

Saloon Turned into an Amusement Hall

It was the belief of some of the officials that the average miner does not go to the saloon for the sake of dissipation but for the social features. This belief became a conviction on further study. After a careful survey of the whole situation it was decided to fit up a club house in the old saloon building and have it operated under the auspices of the Young Men's Christian Association. Before anything was done, however, the whole matter was submitted to the men with the idea that unless they really desired to have such an enterprise in their midst, the company would not supply it.

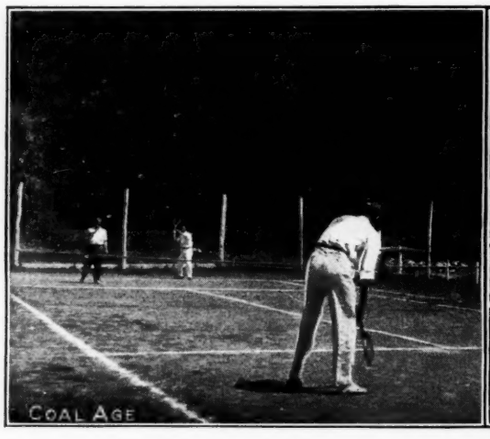
They were not asked to assume any financial responsibility for its inception, but if it was to their liking on

completion they could have its privileges by paying a nominal sum per month. This removed any taint of paternalism that so many similar enterprises labor under, for the men under the leadership of the secretary had the complete control of the whole affair, and spent the income for new apparatus and equipment so that in a short time they had a complete outfit from tennis courts to a swimming pool.

At the beginning the company fitted up the plant with a reading room, shower bath, game room, a casino for the sale of soft drinks, candy and tobacco, also a hall for moving pictures.

Employees Support and Supply Money to Extend the Work

The success was immediate and the place was patronized better than anyone had even hoped. As a surplus of revenue accumulated, two bowling alleys were installed, a piano was procured, also a phonograph and several good records. Later an electric bath cabinet was secured and finally a large outdoor swimming pool was installed, and many other recreative features were added. All this was made possible by the fact that the company was not seeking to get revenue from the enterprise, but were investing their cash in it each month, and it is significant that for every dollar that the company has put into the plant the men have put in an equal amount or more, not as a direct contribution, but as a reinvestment of the surplus income. This gives the men a sense of a proprietary interest in the scheme and develops a sense of mutuality that is invaluable in successful welfare work. The fact that during the recent labor troubles in that region, it was a common sight to see the miners and the "Baldwin Guards" in the pool together shows how popular the place was.



Tennis Courts

Swimming Pool

Dues Are 25c. a Month

Most of the men who live within a mile of the building are glad to pay the nominal sum of 25c. per month for the membership privileges. This fee entitles them to free baths, the reading room, game room and general social privileges as well as a reduced rate for use of the pool tables and bowling alleys. Twice a week a moving-picture show is given, and it is the aim of the secretary to give pictures having an educational value, avoiding the lurid, unreal wild-west type. This machine has also been a great help in giving illustrated lectures on health, safety methods, travel and other topics of interest to the men and women. The miners seem to be more easily reached through the eye than the other senses, and this makes the pictures a powerful moral and educational agent.

Formerly there was little interest in church work taken by these people. Here again the stereopticon came to the rescue. Lectures with colored slides on the Holy Land, Great Men of the Bible, Life of Christ, and other kindred topics were given. Care was taken to avoid sectarianism or denominationalism in these discourses, but to set forth the great fundamentals of right living as exemplified in the lives of great leaders. The appreciation of this effort was shown by the growth of the Sunday school. There were three schools in the neighborhood with a mere handful of attendants. In a few months the attendance had increased to upward of 60 or 80 pupils in each school. It was the universal testimony of all that there had been a general growth toward better things all along the creek.

Decline of the Leading Industry

A single item will indicate one of the great changes that took place in the first three years. The express-company business in transporting distilled liquors decreased from an average of 223 gal. per month to less than 50 gal. in a like period, and the amount of beer brought in decreased about 20 per cent. This, of course, meant much less drunkenness, and with it went a large portion of the gambling which always goes with excessive use of liquor. The few who still drank and gambled did it on the sly as it lost its popularity in the light of the new agency for healthful amusement.

The value of the association was shown in the great strike which all hope is now a thing of the past. While the association takes no sides in a controversy between employer and employee, it sustains a position of mutuality and serves all who come to use what it offers. Several of the mines were able to operate continuously, while all others in the neighborhood were closed. The spirit of a desire to settle differences was more manifest here by both miners and operators than in any other part of the strike zone. Much less time was lost here than in other parts of the field. Some well informed men went so far as to say that if the operators had begun this work five years ago in the entire field, the strike would not have occurred.

DISCUSSION BY READERS

Collapsible Stoppings

Letter No. 9—In reference to the building of light collapsible stoppings that will be destroyed by a local explosion of gas or dust and thus prevent a general mine explosion, it is well to remember that the bituminous mine law of Pennsylvania requires that all stoppings shall be built of noncombustible material. We may ask the question: Why? The answer is plain: Because we must have at least two headings leading to the coal face. The purpose is to provide a continuous intake and return airway for the circulation of the air current. The breakthroughs between these two entries must be made at a given distance apart and closed by air-tight stoppings, except the last breakthrough at the head of the entry, which is left open to allow of the passage of the air current.

Now, would not the building of entry stoppings in such a manner that they would be blown out easily, seriously interfere with the circulation of air and fail to carry out the idea expressed in the mine law in respect to stoppings? If the stoppings are to be built thus light and collapsible, why should not the doors, also, be built in the same manner? What would be the result? The mine water gage would drop, the air would short-circuit and the working face would be made dangerous for work. There would be more danger of an explosion occurring and less chance for the men engaged in the workings to escape.

My plan is to always build entry stoppings 20 in. thick, using one part cement, three parts sand and five parts mine rubble. I sometimes use a 9-in. common red-brick stopping. In a 70-ft. area, I sometimes build a pilaster in the center of the stopping to increase its strength.

ROBT. W. LIGHTBURN.

Adelaide, Penn.

Education and Training of Mining Men

I have been reading the letter of Mine Inspector John Rose, COAL AGE, Oct. 4, p. 509, relating to the practical training of miners by special instructors in the mines, as suggested by Inspector C. H. Nesbitt. I want to say again that, in my opinion, boys should be taken into the mines at an early age and taught how to do every kind of work, by going around with the men. They should know how to hang curtains or put up a brattice, lay tracks or drive a mule. They should be taught the use of the safety lamp and shown how to take it apart, clean it and put it together again, ready for use. The boy should learn this by observing the work being done. Then, when he is older he will be able to do the same work himself.

I differ with Mr. Rose, in his statement that many of the best practical men entered the mine after they were 21 years of age. I believe the results on record will not support this conclusion.

In regard to discipline in the mines, would say I have been bossing for the last 24 years, in different states, and never give a man an order that I do not expect him to obey. Mr. Rose states that many mine foremen who lack discipline, force and system, drift into the habit of telling miners to timber their working places and keep them safe, without expecting them to comply. Such a man is not fit to be a foreman. Of all men, the mine foreman must have discipline and require that his orders be carried out.

It is true that "upon the mine foreman devolves the responsibility for the coal output." A wise foreman, however, knows that he cannot put out the coal without men; and he will not endanger the lives of his miners for the sake of an extra car of coal. Knowing the danger of working under a loose top, a good foreman will compel the miner to set his timbers first, before loading the coal.

In closing, I want to say that the best mine foremen, in this country today, are the men who went into the mines when they were boys. We have many examples of this in the Scotch and English miners, now acting as mine foremen in our mines. Mr. Rose's suggestion that good common sense should be mixed with experience is true; but a man must know how to use both and enforce discipline. The miners soon come to understand the ways of a good foreman and will do what he orders. Such foremen draw a good class of miners around them and are respected by all.

SAMSON SMITH.

Mineral, Va.

The Liquor Problem

From what has been said of the relation of liquor to mining, in previous issues of COAL AGE, the general reader would receive the impression that coal miners are, as a class, harder drinkers than other workmen. The respectable coal miner naturally resents this impression. I believe there are as many hard drinkers among glass blowers, clay workers, lumbermen, salesmen and men of other callings as among miners.

The social standing of the drinker makes a great difference. The head of a corporation or other official is merely "indisposed," while the laborer is "on a drunk." The club man is taken home in his cab, while the coal miner, who is so unfortunate as to drink to excess, is left to his own chances.

Men are very much the creatures of circumstance. A man placed in an isolated mining camp, deprived of clean amusements and opportunities for self-betterment, such as libraries, churches, schools, etc., and thrown into contact with the ever-present gambler and subjected to the influence of the saloon atmosphere—in fact, separated from all refining influences is almost sure to become either a "rip" or an "angel." The environment of a man exerts a tremendous influence in shaping his life and character, and it makes little difference whether he is a coal miner or engaged in some other calling.

One superintendent has suggested that the driving out of 15 families from a mining community improved the conditions in that place. It must be remembered, however, that such an improvement is only local. Nothing has been done in their removal, to alter the life and surroundings of those 15 families who are driven from one mining camp to another; and the greatest sufferers, in such cases, are the wives and children of the men addicted to the drink habit. While it may be necessary to make an example of some cases, more attention should be given generally to reforming the drinker, by removing from him, as far as possible, the temptation and opportunity to drink and surrounding him with a different atmosphere that will give him greater encouragement to live better.

The problem must be fought from a broader standpoint. The question must be studied in its widest aspects. Efforts must be made to remove the evil and put in its place what will tend to the uplift and betterment of the community. Create a desire for self-improvement, study and recreation. Ascertain what is most needed to effect a transformation. Many drink because liquor is within their reach; therefore, remove the saloon and discourage the liquor traffic, in every way possible. It is well to remember that a man should not be blamed too strongly if he is overcome by conditions for which we are all responsible. I want to repeat that the liquor problem is not limited to coal mining but affects all industries alike.

GEO. N. LANTZ.

New Straitsville, Ohio.

Afterdamp

The principal gases resulting from mine fires are carbon monoxide, carbon dioxide and nitrogen. The relative quantities of these several gases will depend on the supply of fresh air to the fire. As the fresh-air supply is increased, the volume of carbon dioxide resulting will be greater, while that of carbon monoxide and nitrogen will be less; and *vice versa*.

The gases resulting from an explosion of firedamp are quite variable, depending on the composition of the firedamp mixture and the conditions affecting the circulation of air in the mine; also the condition of the mine workings with respect to dust and moisture. In a general way, the composition of afterdamp may be said to consist chiefly of carbon dioxide, carbon monoxide, nitrogen and water vapor, together with smaller amounts of nitrous oxide gas, unburned marsh gas and free hydrogen.

FIREBOSS.

Fairmont, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

What the Wet-and-Dry-Bulb Hygrometer Indicates—The wet-and-dry-bulb hygrometer shows the difference between the readings of the two thermometers. The dry-bulb thermometer, of course, indicates the actual temperature of the air. The reading of the wet-bulb thermometer is lowered by the evaporation of the water from the little sack surrounding this bulb, and which is kept moist by the water drawn up through the wick from the vessel below.

The difference of temperature indicated by these two thermometers depends on the rapidity of the evaporation of the water from the wet bulb. The evaporation is more rapid in dry than in wet air; and the difference of reading is, thus, an index or measure of the degree of saturation of the air. When the air is fully saturated with moisture there is no evaporation from the wet bulb and the readings of the two thermometers are the same. The difference increases with the dryness of the air.

Relative Humidity of Air—As previously explained the relative humidity of air is expressed by the ratio of the actual vapor pressure in the air at the time, to the saturated vapor pressure. The following table gives the percentage of saturation or the hygrometric state of air for various differences of readings, at different temperatures.

DIFFERENCE BETWEEN DRY AND WET BULB.

Reading of Dry Bulb Ther	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	17.5	18°	18.5	19°	19.5	20°	20.5	21°
	RELATIVE HUMIDITY																								
65°	95	90	85	80	75	70	66	62	57	53	48	44	40	36	32	28	25	23	21	19	17	15	13	12	10
66°	95	90	85	80	76	71	66	62	58	53	49	45	41	37	33	29	26	24	22	20	18	17	15	13	11
67°	95	90	85	80	76	71	67	62	58	54	50	46	42	38	34	30	27	25	23	21	20	18	16	15	13
68°	95	90	85	81	76	72	67	63	59	55	51	47	43	39	35	31	28	26	24	23	21	19	17	16	14
69°	95	90	86	81	77	72	68	64	59	55	51	47	44	40	36	32	29	27	25	24	22	20	19	17	15
70°	95	90	86	81	77	72	68	64	60	56	52	48	44	40	37	33	30	28	26	25	23	21	20	18	17
71°	95	90	86	82	77	73	69	64	60	56	53	49	45	41	38	34	31	29	27	26	24	22	21	19	18
72°	95	91	86	82	78	73	69	65	61	57	53	49	46	42	39	35	32	30	28	27	25	23	22	20	19
73°	95	91	86	82	78	73	69	65	61	58	54	50	46	43	40	36	33	31	29	28	26	24	23	21	20
74°	95	91	86	82	78	74	70	66	62	58	54	51	47	44	40	37	34	32	30	29	27	25	24	22	21
75°	96	91	87	82	78	74	70	66	63	59	55	51	48	44	41	38	34	33	31	30	28	26	25	23	22
76°	96	91	87	83	78	74	70	67	63	59	55	52	48	45	42	38	35	34	32	30	29	27	26	24	23
77°	96	91	87	83	79	75	71	67	63	60	56	52	49	46	42	39	36	34	33	31	30	28	27	25	24

To use the table, find the observed temperature of the air, in the left-hand column, and the difference of the observed readings of the wet and dry-bulb thermometers, at the top of the table; the corresponding number in the table is the percentage of saturation which expresses the degree of humidity of the air. For example, if the dry-bulb temperature is 70 deg. and the wet bulb 64 deg. F. the difference of readings is 6 deg. and the corresponding humidity as taken from the above table is 72 per cent.

The Coal Age Pocket Book

Actual Vapor Pressure—The pressures given in the table below are the pressures the vapor exerts when the space it occupies is fully saturated; they are called the "saturated vapor pressures." When the weight of vapor in the air is not sufficient for saturation the vapor pressure will be eactly proportional to the degree of saturation. For example, if 50 per cent. of moisture is present or the air only half saturated, at, say 70° F., the "actual vapor pressure," as it is called, is one-half of the saturated vapor pressure of the table given later; or ½ × 0.3602 = 0.1801 lb. per sq.in.

To Calculate the Actual Vapor Pressure from the difference of the wet- and dry-bulb temperatures ($t_d - t_w$) and the barometric pressure (B), in inches of mercury, first find the saturated vapor pressure (P_w), in inches of mercury, corresponding to the wet-bulb temperature (t_w), from the table; and substitute this and the given values in the formula

$$\textit{Actual vapor pressure at temperature } t_d = P_w - \frac{B}{30}\left(\frac{t_d - t_w}{88}\right)$$

Example—Find the actual vapor pressure when the dry bulb reads 60° and the wet bulb 54° F., the barometric pressure being B = 30 in., and the saturated vapor pressure for the wet-bulb temperature (54° F.) being 0.4178 in. of mercury.

Solution—

$$p = 0.4178 - \frac{30}{30}\left(\frac{60 - 54}{88}\right) = 0.3497 \textit{ in. of mercury}$$

Since the saturated vapor pressure (see table) for the dry-bulb temperature (60° F.) is 0.5183 in., the relative humidity in the above example is

$$H = \frac{p}{P_d} \times 100 = \frac{0.3497 \times 100}{0.5183} = 67.4 \textit{ per cent.}$$

The Dew Point—What is called the "dew point," in hygrometry, is the temperature below which the moisture contained in the air begins to be deposited. For example, the weight of moisture, in grains per cubic foot, contained in the air, in the above example is (1 lb. = 7000 grs.)

$$w = 7000 \times 0.6235\frac{0.674 \times 0.2545}{0\ 37\ (460 + 60)} = 3.9 \textit{ grs. per cu.ft.}$$

The temperature at which this weight of moisture will fully saturate a cubic foot of air is the dew point, because the slightest fall of temperature below that point will cause a deposition of moisture from the air.

The dew-point temperature is ascertained, in any given case, by first calculating the actual vapor pressure of the moisture in the air, as in the above example; and then, by referring to the table of saturated vapor pressures, find the temperature corresponding to that vapor pressure. This is true, because, as previously stated, the actual vapor pressure, at any given time, is equal to the saturated vapor pressure for the dew-point temperature. Thus, the actual vapor pressure for dry bulb 60° and wet bulb 54° was found to be 0.3497 which corresponds to a saturated vapor pressure or dew point of 49 deg.

INQUIRIES OF GENERAL INTEREST

Working Coal under Sandstone Cover

We are working a seam of lignite coal that varies from 6 to 12 ft. in thickness. The seam has an average pitch of about 3 per cent. A portion of the mine has reached the boundary line and the work of drawing back the pillars will soon be commenced. At the present time, the workings are largely standing on pillars.

Immediately overlying the coal is a sandstone that varies in thickness from 90 to 140 ft. The entire overburden varies from 100 to 400 ft. Underlying the coal is 12 in. of a hard fireclay that forms the floor of the seam. This is underlaid with 12 in. of a soft fireclay, beneath which is a hard rock varying from 1 to 2 ft. in thickness. The rooms are driven up the pitch and are 21 ft. wide with 30-ft. pillars between them, the rooms being driven on 51-ft. centers. The rooms are broken off the entry 10 ft. wide for a distance of 25 ft. and then widened out to the full width. Crosscuts are driven in the rooms every 70 ft. and are 10 ft. wide, leaving a pillar 60x30 ft. The rooms are usually driven 350 ft. in length, leaving a 60-ft. barrier pillar between the faces of the rooms and the air course of the next pair of entries.

Much difficulty has been experienced by the heaving of the bottom where the weight was too heavy on the pillars. The sandstone roof crumbles and falls from 6 to 10 ft. above the coal and, to avoid this trouble, there is generally left from 2 to 4 ft. of roof coal when driving up the room.

I would like to have the readers of COAL AGE offer any suggestions in regard to the working of this seam, with particular reference to the breaking of the thick sandstone, so that the largest possible amount of coal can be realized in drawing back the pillars. Any information based on experience will be greatly appreciated.

W. N. ANDERSON.

Colorado Springs, Colo.

A SIMILAR INQUIRY FROM WEST VIRGINIA

If you consider it of sufficient interest will you kindly ask the readers of COAL AGE to discuss, from a practical standpoint, the best method of robbing a 7- to 8-ft. seam of coal, overlaid with a hard sandstone that is free from surface breaks. The seam is underlaid with a comparatively soft stratum that has a strong tendency to heave. The cover varies from 400 to 1000 ft. in thickness. The mine is worked on the panel system.

I would very much appreciate any practical suggestions in regard to the width of rooms and pillars, and the method to be employed for drawing back the pillars that will insure a maximum recovery of the coal, with the use of a minimum amount of timber.

WEST VIRGINIA ENGINEER.

Stotesbury, W. Va.

[The foregoing inquiries, coming as they do at the same time, and asking for the discussion of practically like conditions in the mining of coal, show the great importance attaching to this subject. The two inquiries come from widely separated points and describe conditions that depend for successful working on practically the same essential feature, namely, the proper control of a strong roof pressure due to a hard sandstone rock and a heavy overburden.

We hope that these inquiries will bring forth a hearty response from men who have dealt successfully with similar conditions. Let there be a good discussion, accompanied by sufficient illustrations to make clear the methods suggested.—ED.]

A Crossover Problem

At the request of a correspondent, we give below a diagram of a double crossover switch or "diamond," and shall be glad to have those interested in such problems

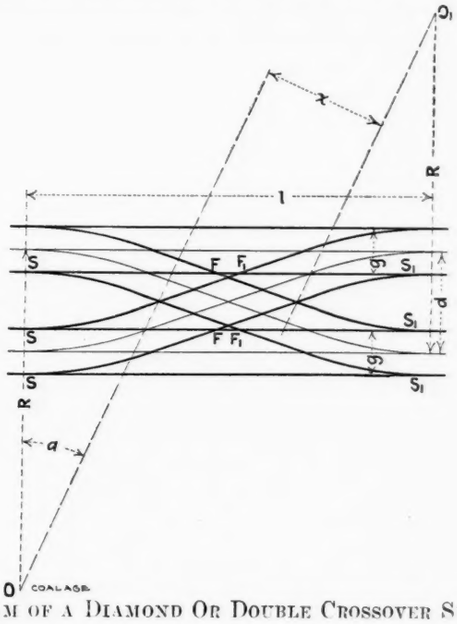


DIAGRAM OF A DIAMOND OR DOUBLE CROSSOVER SWITCH

send us their solutions to the same. We will publish the best, shortest and simplest of the solutions sent us and announce the name only, of the author of the second-best solution.

The problem is as follows: Given, the entire length (l) of crossover, from point of switch to point of switch; the distance (d) between track centers, the gage (g) of the tracks, and the radius (R) of the curves, all the curves having the same radius; it is required to find the frog distance $S\,F$ or $S_1\,F_1$; the length (x) of the straight rails at the center of each crossover; the length and radius of curve, for each rail in each switch; the length of lead rail and the frog angle.

The best solution of this problem will be published in our issue of Dec. 20. The second-best solution will be announced by name only. The problem is an interesting one in mine engineering.

The Government's Classification of Coal

The classification of coal into various grades such as bituminous, semi-bituminous, lignite, etc., is arbitrary and unsatisfactory. It is, however, in common use in the United States, and in the absence of anything better. it is published by the U. S. Geological Survey. The classes generally used in this country are as follows: Anthracite, semi-anthracite, semi-bituminous, bituminous, sub-bituminous and lignite.

Anthracite coal is generally well known, but in a systematic classification it is usually defined as a hard coal, having a fuel ratio (fixed carbon divided by volatile matter) of not less than 10. Most of this coal comes from the anthracite fields of eastern Pennsylvania, but small areas are known in some of the Western states where the coal has been changd to anthracite by the heat and pressure of masses of igneous rock.

Semi-anthracite coal has a fuel ratio ranging from 6 to 10. There is only a small amount of this coal in the United States, found in local basins or in close proximity to igneous rock. Semi-bituminous coal is of great commercial importance, but is not widely distributed. Its fuel ratio ranges from 3 to 6. It is the best steam coal in the country, and some of it can be utilized in the manufacture of coke. The centers of production are the Pocahontas and New River fields of Virginia and West Virginia, the Georges Creek field of Maryland, the Clearfield region of Pennsylvania, and the west end of the Arkansas field in the vicinity of Fort Smith. Although areas containing coal of this grade have been found in Washington and Colorado, the amount in these fields is small.

Bituminous coal is the most important grade in the country, and includes most of the deposits east of the Rocky Mountains. In the Western states there are large areas of bituminous coal such as the Trinidad-Raton field of Colorado and New Mexico, the Grand Hogback field of Colorado, the Book Cliffs field of Utah, the Rock Springs, Kemmerer and Black Hills fields of Wyoming, the Great Falls field of Montana and many districts in Washington. This grade furnishes most of the coking coal of the country, and is largely sold for steam raising and domestic use.

The term sub-bituminous has been adopted by the Geological Survey for what has generally been called black lignite. The latter term is objectionable for the reason that the coal is not lignitic in the sense of being woody, and the use of the term seems to imply that the fuel is little better than the brown woody lignite of North Dakota, whereas many of the coals of this class closely approach the lowest grade of bituminous.

It is extremely difficult to separate this class from the one below and the one above. It is generally distinguished from the lignite by its color and freedom from apparent woody texture, and from bituminous coal by the slacking which it undergoes when exposed to the weather, as the latter is an important difference in commercial use, it has been adopted by the Geological Survey as a criterion for the separation of sub-bituminous and bituminous coal.

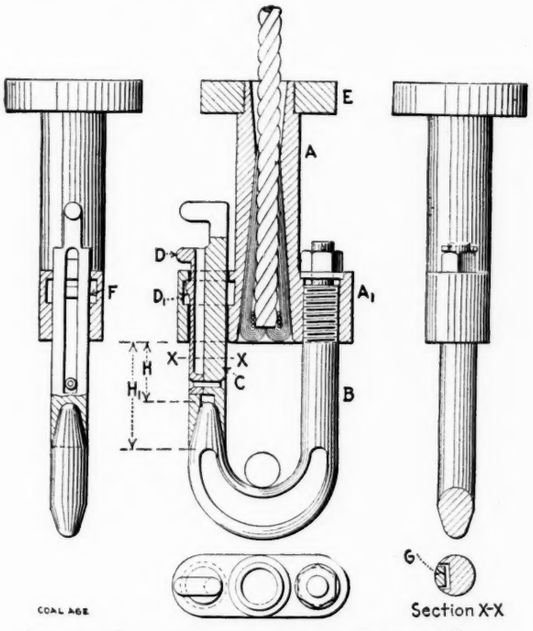
Sub-bituminous coal is found in most of the Western fields, being well known around Boulder and Denver and in northern parts of Colorado, Gallup, New Mexico, Hanna, Douglas, Sheridan and the Big Horn Basin of Wyoming, Red Lodge and Musselshell, Montana, and in many of the districts of Washington and Oregon.

As used by the Geological Survey the term lignite is restricted to the coals which are distinctly brown, and generally woody. They are intermediate in quality between peet and sub-bituminous coal. Lignite is abundant in the North, in eastern Montana and North Dakota and in the southwest corner of South Dakota. In the South it is present in all of the Gulf states, but has been developed commercially only in Texas.

❋

Safety Hook for Sinking Buckets

A new safety hook for sinking buckets in connection with a cable clamp has been devised by an engineer at the Myslowitz colliery, in the North Kattowitz mining district of Germany and has been used there with good success. It is described in the "Zeitschrift für das Berg-Hütten- und Salinenwesen." It consists of the following principal parts: (1) The cable sleeve A with flange A_1 forged from the same piece; (2) the bucket hook B; (3) the lock bolt C; (4) the lock spring D welded on lug D_1; (5) the flange E.



DETAIL CONSTRUCTION OF THE SAFETY HOOK

The cable clamp is bored out conically for receiving and fastening the rope. In the flange A_1 are held the bucket hook B and the lock bolt C which together form a closed shackle, the hook B being screwed into the flange A_1 and further secured with a keyed jam nut,, while the lock bolt C is loosely passed through its hole in the flange.

The lock bolt C is made of an iron bar cut or forged away at the upper part and is formed at the top as a handle for easy manipulation. At the lower end it is bored out conically to receive the point of the bucket hook. It is provided lengthwise with the groove G in which is set and riveted the lock spring D. The safety hook is closed in the illustrated position and, by the lock spring D, upon which the lug D_1 engaging in the cavity F, prevents self release of the lock bolt C and thus an

unhooking of the bucket suspended from the hook B even when the bucket is let down to the bottom of the shaft and the rope is slackened.

In order to let the bucket be hooked to and unhooked from the hoisting cable, the workman must press back the lock spring D and raise the bolt C, which opens the bucket hook. As soon as the bolt is let go, it falls back by its own weight and again the lock spring D closes the lock bolt C by an engagement of the lock-spring lug D_1 in the cavity F. The flange E screwed on the rope sleeve prevents the bolt C from being lifted so high as to drop out when opening the hook.

The manipulation of this safety hook is easy and simple. Its security is automatic and reliable. In making the hook care is taken that the upward movement H_2, allowed for the lock bolt, bears a correct proportion to H and H_1.

❋

Trimming Coal on Freight Cars

The St. Louis & San Francisco R.R. has issued the following instructions to coal shippers on its lines:

Lump coal and run-of-mine coal extending above the sides of open cars must have the lumps ranked as shown in Fig. 1 for steel cars, and Fig. 2 for wooden cars.

Careless and improper loading not only makes possible losses of contents by spilling off sides of car, but helps to create a shortage of equipment.

The difference in weight of a car properly loaded and the one improperly loaded amounts to about 8500 lb. On this basis 92.09 cars properly loaded would contain as much coal

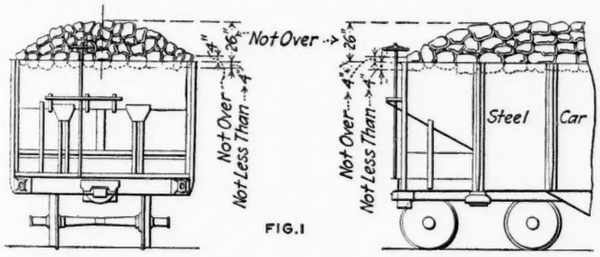


FIG.1

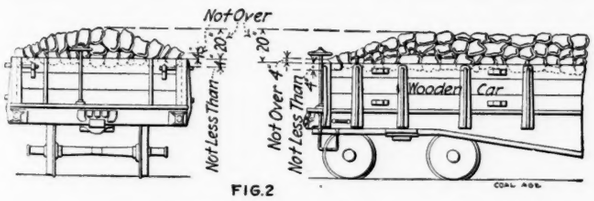


FIG.2

TRIMMING COAL ON GONDOLA AND HOPPER CARS

as 100 cars only loaded partially, making available for loading 7.91 more cars.

During the year ending June, 1913, there were 115,168 cars of coal loaded on the Frisco R.R., an average of 442.95 loaded cars per mine working day. (Estimated 260 mine working days per year.)

If these 115,168 cars were only partially loaded the gain by well trimming and careful loading would have equaled 893 cars during the year 1912-1913. This would mean a daily increased available car supply of 38.05 cars.

This not only means increased car efficiency from a railroad operating viewpoint, but will result in the same ratio of increased mine efficiency. In times of car shortage making mine cars do the work of 10 cars would be of inestimable value to both the coal operators and the railroad.

Mine superintendents should be instructed to secure full capacity loading of all cars, bearing in mind rule allowing 10 per cent. in excess of marked capacity as load limit, and to observe requirements for properly trimming loads permitting safe haulage.

Note—These instructions are not to affect tariffs or rules prescribing maximum loading.

Unwatering a Flooded Mine

BY ALEX. BLAIR, JR.

During the floods along the Ohio River last April, Green River broke into a mine belonging to the Pittsburgh Coal Co., at Spottsville, Ky., and flooded the workings. The recent excavations cover about 200 acres and are connected to a series of old workings along the river bank which had been driven for a short distance and then abandoned.

The coal here is 50 ft. below the surface and lies about 5 ft. above low-water mark. The total area flooded was 600 acres and the amount of water that entered was approximately 300,000,000 gallons.

The mine underlies the town of Spottsville, and while the water was running in, it forced the gas and black damp up through the overburden, so that it made its appearance in ditches, wells and cisterns, in one case boiling a cistern over and making the air so rank that an oil light could not be held within several yards of it.

The water ran into the mine for 30 hours, finally reaching the level of the river. There was a haulage motor and four machines on a small hill within 300 ft. of the bottom, which was all of the machinery in the mine at the time, except a small electric pump. Effort was made immediately to enter at the main shaft and reach this machinery, but was unsuccessful on account of the volume of blackdamp which the water was forcing out. Luckily, there were over 100 acres of dip workings which took the water at first, keeping it away from the machinery, but the air shaft is at the lowest point of the seam and the water had reached the roof there, cutting off ventilation.

Word was sent to the Government Rescue Station at Evansville, asking for help and helmets, but on account of the floods, the railroads were out of commission, and as there was a high wind on the river no boat would venture out from Evansville. The John Archbold Coal Co. then offered the service of their tug, the J. B. A., and brought the rescue party to the mine after the water had been running for fourteen hours.

Mr. Powell, the foreman in charge of the Government car, Mr. Blair, the superintendent of the mine, and two men donned helmets immediately, and within two hours had the machinery on top.

It was decided to wait for low water to commence the unwatering of the mine, on account of the fact that the greater part of the old workings were to the raise from the outcrop in the river bed, which was about 5 ft. above extreme low-water mark. This permitted the driving of a tunnel at low water into the workings and the drainage of a greater part of the water in the mine.

The drift was completed and holed through into an old air shaft along the river bank on July 16. A bore hole was kept ahead as the shaft was approached, because the latter contained 34 ft. of water. The drift was extended to within 8 ft. of the shaft, when an opening was made into it, successfully, by firing a shot containing 26 sticks of 60 per cent. dynamite. This released a 4-ft. stream of water, which ran with gradually diminishing force for 48 hr. Concrete stoppings were put in and the remaining water pumped through the air shaft which is at the lowest point and is 90 ft. deep, by means of a Nye steam pump having a capacity of 1000 gal. per minute.

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—(*a*) How much water would an entry hold, in 100 ft. of its length, if the entry measures 6 ft. wide at the top, 9 ft. at the bottom and is 6 ft. high? (*b*) If one-half of this quantity of water was standing in the entry, what would be the depth of the water?

Ans.—(*a*) The sectional area of the entry is $6\ (6 + 9) \div 2 = 45$ sq.ft. The cubic contents of this entry, in a length of 100 ft., is $100 \times 45 = 4500$ cu.ft. If this entry is full of water, it will hold $4500 \times 7.48 = 33{,}660$ gal.

(*b*) If the entry is filled to only one-half its capacity, the sectional area of the water will be $45 \div 2 = 22.5$ sq.ft. The cross-section of the entry shows that the width decreases 3 ft. in 6 ft. of height, or ½ ft. in every foot of height. Then, calling the required depth of the water d, the bottom width of the entry being 9 ft., the width at the surface of the water would be $9 - d/2$. The sectional area of a trapezoid is equal to the sum of the top and bottom widths multiplied by half the vertical height; or, in this case, the sectional area of the water is

$$\left(9 + 9 - \frac{d}{2}\right)\frac{d}{2} = 9\,d - \frac{d^2}{4}$$

Equating this expression for the area of the cross-section of the water, with the value of one-half the sectional area of the entry (22.5 sq.ft.), as found above, and arranging the terms, gives,

$$-\frac{d^2}{4} + 9\,d = 22.5$$

Multiplying both sides of the equation by —4 to clear of fractions gives

$$d^2 - 36\,d = -90$$

Now, complete the square, in the first member, by adding the square of one-half the coefficient of the second term or $18^2 = 324$, to both sides of the equation. Thus,

$$d^2 - 36\,d + 18^2 = 324 - 90 = 234$$

Finally, extracting the square root of each side of the equation, gives,

$$d - 18 = \pm\sqrt{234} = \pm 15.3$$

and

$$d = 18 - 15.3 = 2.7\ ft.$$

The depth of the water, therefore, is 2.7 ft.

Ques.—An air current of 80,000 cu.ft. of air per min. is passing in a mine, in the following three splits:

Split A, 6 × 8 ft., 3000 ft. long
Split B, 4 × 16 ft., 2000 ft. long
Split C, 8 × 10 ft., 5000 ft. long

(*a*) Calculate the natural division of this air current, giving the quantity of air passing in each split. (*b*) Assuming that all the splits start from the shaft bottom, find the ventilating pressure at the foot of the shaft, for the entire mine. The lengths given for the several splits include the return airways, in each case. (*c*) Find the horsepower on the air at the shaft bottom.

Ans.—(*a*) The first step is to calculate the area (a), perimeter (o) and length (l) of the airway in each split, as follows:

A, $a = 6 \times 8 = 48$ sq.ft.; $o = 2\ (6 + 8) = 28$ ft.; $l = 3000$ ft.

B, $a = 4 \times 16 = 64$ sq.ft.; $o = 2\ (4 + 16) = 40$ ft.; $l = 2000$ ft.

C, $a = 8 \times 10 = 80$ sq.ft.; $o = 2\ (8 + 10) = 36$ ft.; $l = 5000$ ft.

The next step, in order to simplify the work as much as possible, is to reduce these areas, perimeters and lengths to the lowest relative values, by canceling common factors, in each case. This gives for the relative areas, perimeters and lengths the following prime values:

A, $a = 3$, $o = 7$, $l = 3$
B, $a = 4$, $o = 10$, $l = 2$
C, $a = 5$, $o = 9$, $l = 5$

The third step is to calculate the relative split potentials, using the formula

$$X = a\sqrt{\frac{a}{lo}}$$

The values of these potentials for the different splits are, therefore, as follows:

A, $X_a = 3\sqrt{\frac{3}{3 \times 7}} = 3\sqrt{\frac{1}{7}} = 3\sqrt{0.1428} = 1.1340$

B, $X_b = 4\sqrt{\frac{4}{2 \times 10}} = 4\sqrt{\frac{1}{5}} = 4\sqrt{0.2000} = 1.7888$

C, $X_c = 5\sqrt{\frac{5}{5 \times 9}} = 5\sqrt{\frac{1}{9}} = \frac{5}{3} = 1.6667$

Sum of potentials = 4.5895

Since the quantity of air passing in each split is proportional to the split potential, the several quantities are found as follows:

A, $q_a = \frac{1.1340}{4.5895} \times 80{,}000 = 19{,}770$ *cu.ft. per min.*

B, $q_b = \frac{1.7888}{4.5895} \times 80{,}000 = 31{,}180$ *cu.ft. per min.*

C, $q_c = \frac{1.6667}{4.5895} \times 80{,}000 = 29{,}050$ *cu.ft. per min.*

Total 80,000 *cu.ft. per min.*

(*b*) In splitting air currents, it is assumed that the pressure at the mouth of the splits is the same for each split. Therefore, the pressure producing the circulation, at the foot of the shaft where the air is divided, as calculated from split A, is

$$p = \frac{0.00000002 \times 3000 \times 28 \times 19{,}770^2}{48^3}$$

$$= 5.93\ lb.\ per\ sq.ft.$$

(*c*) The horsepower on the air, at the foot of the shaft or the mouth of the splits is, then,

$$H = \frac{Qp}{33{,}000} = \frac{80{,}000 \times 5.93}{33{,}000} = 14.37\ hp.$$

COAL AND COKE NEWS

Washington, D. C.

In view of the apparent delay with reference to the Keating resolution directing an investigation into the Colorado coal strike, Mr. Keating, on the 7th inst., made an attempt to get the resolution directly before the House of Representatives and secure action thereon, possibly by having it referred to a special committee. The resolution was introduced several days ago and referred to the House Committee on Rules, which has taken no action. Mr. Keating explained that the committee had no quorum, and he wanted his resolution referred to the Committee on Labor.

The motion precipitated a debate in which several members joined to discuss the merits of authorizing Congressional investigations into such matters when there exists a competent bureau in the administrative branch of the government for doing this work. Representative Page, of North Carolina, said that he believed that the Industrial Relations Commission which was authorized by the last Congress had the power to investigate the Colorado labor difficulties.

Representatives Mann and Mondell, of the Republican side, criticized the resolution, because it created a committee specially for the purpose of this one investigation. Mr. Mann said that the Bureau of Corporations in the Department of Commerce had the authority to investigate the matter, and Mr. Mondell said that the labor difficulties should be looked into by the Department of Labor.

Mr. Keating replied to the effect that the Department of Labor had considered the matter, but had found itself unable to proceed with an investigation. Mr. Mondell thereupon asserted that if the Democrats had voted for a sufficient appropriation for the department this handicap would not be apparent. No definite result has yet been arrived at in the matter.

Rates Must Not Be Increased

The St. Louis, Rocky Mountain & Southern and other railroads will not be permitted to increase the New Mexico coal rates according to a decision of the Interstate Commerce Commission announced on Nov. 4. The Rocky Mountain line attempted to cancel all through rates with the Rock Island road, thereby advancing the rates to Kansas City, St. Joseph, Omaha, Lincoln, Atchison, Wichita and other points.

It was discovered in this connection that the advance in rates was the result of the desire of the Rocky Mountain to receive greater divisions of the through rates. The commission ruled that differences between carriers over divisions in rates are not sufficient reason for advancing rates, and the roads were ordered to maintain in existence for two years from Nov. 1 the present rates.

The Red Ash Coal Co., of Ashley, Penn., has petitioned the commission for through rates and joint rates on anthracite coal from the collieries and washeries on the line of the Central Railroad of New Jersey to points on the Lehigh Valley west of Sayre to Buffalo, for transshipment by water and reshipment by rail to Suspension Bridge, for reshipment by rail, and to points west. The Lehigh Valley and other railroads were named defendants.

Senator Reed's amendment to the interstate commerce act proposing to make natural-gas pipe lines common carriers within the meaning of the law has been approved by the Senate without a recorded vote. The act now makes pipe lines transporting oil common carriers, whereas the amendment would add to that classification pipe lines transporting natural gas and submit such pipe lines to the regulation of the Interstate Commerce Commission.

The bill was adopted by the Senate on Nov. 3 with but little debate. Senator Reed took up most of the time given over to the discussion of the proposition in explaining its import. The bill now goes to the House for its approval.

HARRISBURG, PENN.

An extra session of the legislature is being suggested as the only means of solving the question that now confronts the state since the defeat of the $50,000,000 road loan.

It seems that Governor Tener has no alternative but to call an extra session for the purpose of arriving at some definite understanding of the most important question confronting Pennsylvania at the present time.

Unless the second proposed amendment to the construction which was voted upon at the same time as the $50,000,000 road loan, is adopted, which will not be definitely known until the official count is made by the state department, such new acts as the "female labor law," etc., cannot be passed by the legislature, therefore it is contended that they are unconstitutional.

Article 3, Section 7 of the constitution provides that the general assembly shall not pass any local or special law regulating "labor, trade, mining, or manufacturing," until this section is repealed.

Labor unions were specially interested in this amendment, but in their effort to defeat the road loan, they have probably defeated the second amendment also. Following the cue of the state grange, the miners' union in the hard-coal region went on record against the loan. Their attitude was popular in the coal regions, and every hard-coal county, excepting possibly Luzerne voted down the road loan and their pet amendment with it.

Governor Tener within a few days will appoint the first state economy and efficiency commission, provided for by the last legislature to introduce modern methods in the various departments of the state government, and to see if the letter of the law creating the various departments is being lived up to.

Concerning the "Check-Off"

That the independent coal operators and the United Mine Workers may come closer together and that they will allow the "checkoff" is indicated by the attitude of the Clearview Coal Co., which operates a colliery at North Scranton, agreeing to allow the check-off. This is the first company to grant the check-off, but the union officials ultimately hope to have other independent operators grant their request, which in time they think will be followed by the big coal companies of the anthracite region.

Under the agreement made by the Clearview people, the dues will be deducted from the earnings of the men and will then be turned over to the properly authorized officer of the local union. On the part of the union it is agreed that there will be no strikes. All the men engaged in and around the colliery must be members of the union.

In granting the check-off it was stipulated and agreed that the men will have to sign off and deposit with the company authority to deduct their dues and waivers that will protect the company legally.

The plan is expected by both parties to the agreement to result in increased production for the company and in uninterrupted work for the men.

PENNSYLVANIA

Anthracite

Pittston—A fatal accident recently occurred in No. 9 colliery of the Pennsylvania Coal Co. when a premature blast instantly killed two men and seriously injured three others. Samuel Haddon, a prominent rock contractor and Thomas Williams were the men killed. They had prepared a blast, and shortly after dinner as is the usual custom the battery was applied. It failing to set the blast off, Haddon and Williams went to the face of the tunnel to learn the trouble, the switch on the battery being turned off. Just as they reached the blast the heavy charge exploded. The mine officials are at a loss to explain how the explosion occurred after the battery had been shut off.

Mahanoy City—Mahanoy Creek broke into the workings of the Draper colliery, flooding the mine and causing considerable damage. About 200,000 gal. an hour are being pumped from the mine, in spite of this the water has crept 35 ft. up the slope. The course of the creek is being changed

Nanticoke, Penn.—The Truesdale colliery of the Delaware, Lackawanna & Western R.R. Co. has produced more coal in the last year than any ordinary colliery in the anthracite field. A new record was set for the month of October, 105,020 tons being produced and shipped. Including retail sales the output for the month was 108,220 tons.

Two men were killed instantly and two others narrowly escaped death in the shaft of the Auchincloss colliery of the Lackawanna Coal Co. recently, when a concrete block weighing several hundred pounds fell part way down

the shaft and crashed through the cage on which they were standing. The men were engaged in repairing a beam in the shaft, below the surface level, and the concrete was part of the water line used to carry away drippings from the side walls and prevent their trickling to the bottom, it became loosened within a few minutes from the time it was inspected as the men went down the shaft.

Bituminous

Indiana—The Manor Real Estate & Trust Co. recently obtained the holdings of the Greenwich Coal & Coke Co., a tract of something more than 27,000 acres in Greene and Buffington Townships paying approximately $4,000,000. It is expected that the Cherrytree & Dixonville R.R. will be extended to the new coal field and will be the coal carrier.

New Castle—Attorney B. H. Akens recently delivered a deed to John K. Bell, of Pittsburgh, for 800 acres of coal land in Washington County, formerly owned by the Washington County Coal Co., now bankrupt. The purchase price was $165,0000.

Washington—An injunction was recently granted by the court upon the petition of the Reliance Coal Co., of Centerville, against five miners. This litigation has grown out of the trouble at the Reliance Coal Co. property over the determination of the company to operate nonunion. The defendants are restrained from interfering with the employees of the said company or its property.

Independence—Two farms at this place have been sold in the last few days. Both are large farms, the Dodds containing 202 acres and the Brown farm upward of 250 acres. The coal under the Brown farm was sold sometime ago to the Meadow Lands Coal Co. The Dodds farm contains a good tract of timber largely locust. The coal was reserved.

WEST VIRGINIA

Wellsburg—The strike situation at the La Belle and Gilchrist mines near here remains about unchanged. No attempt has been made to bring in strike breakers. The strikers demand a working day of eight hours, a check weighman and recognition of the union. The operators are willing to concede the first two propositions, but refuse to recognize the miners' organization.

Charleston—In order to keep in closer touch with the accidents that occur in and around the mines of the state, the Department of Mines has sent out circular letters asking the coal operators in the state in making their reports of accidents to the mine inspectors to make duplicate copies, sending one directly to the office of the Department of Mines, and another to the inspector as heretofore. The Department of Mines is called upon almost daily for information concerning accidents, and in the future it is desired to be able to give this information promptly.

Bluefield—A new company styling itself the Sandy Ridge Coal & Coke Co. was recently organized here. This firm proposes to develop about 175 acres in Russel County, Va., which carries five commercial beds of coal above water level. This property lies on a branch of the Norfolk & Western R.R.

TENNESSEE

Chattanooga—It is reported that financial backing has been assured for the Cumberland Colliery Co., which will shortly erect near Chattanooga coke ovens and a byproduct plant representing an investment of $1,500,000. It is understood that the plant will be located either in Lookout Valley or upon Moccasin Bend.

KENTUCKY

Louisville—The Wilhoit Coal Co., which has been operating mines in the Harlan district of eastern Kentucky, has been adjudged bankrupt in the District Court of Louisville on the petition of three creditors, the Standard Oil Co., the Swann-Abram Hat Co. and the Keuffel & Esser Co. It is understood that Roy Wilhoit, president of the company, has a personal claim covering most of the company's property. Mr. Wilhoit stated after the adjudication that the status of the company will in no way affect his other interests, one of the principal of which is the Cumberland Coal Corporation, which controls a large acreage of valuable coal land in the Harlan field.

Middlesboro—The recently announced purchase by the Kentucky Utilities Co., of the Asher electric power plant, which has been operated by the Southern Mining Co., has excited much interest among operators in that section, who appreciate the possibility of using electricity for all power requirements in their mines at an early date. It has been announced from the company's offices at Lexington that it will extend lines into the territory west and south of Middlesboro, as far as the Clear Fork district, for the benefit of coal operations; and it has been reported also that an electric interurban line will ultimately be established by the company, terminating at Jellico on the south and Middlesboro on the north. At the present time, the mines of the Bell and Bath County field will be served.

OHIO

Columbus—The Ohio Mining Commission took up the greater part of the week ending Nov. 8 with hearing arguments from the miners' side of the question, of the method to be used in paying for coal mined in the state. John Moore, William Green and others, of the United Mine Workers of America, appeared before the commission to argue the justice of paying on the mine-run basis. The week begining Nov. 10 will be given over to hearing arguments from the operators.

Martins Ferry—Ground has been broken by the Morgan Coal Co., of Bellaire, for a new mine located between Bannock and Fairpoint, Ohio. Arthur Morgan, of the Edgehill Mine, of Bellaire, is the owner of the new operation, which is located on the C. L. & W. division of the B. & O.

Congo—Mine No. 301 of the Sunday Creek Co. was set on fire recently by a short-circuit in the electrical equipment. The mine is connected with Mine No. 302 across the creek and steps were taken at once to seal up the mine to prevent the fire from spreading to No. 302. This has been accomplished. Mine No. 301 will remain sealed up until it burns itself out. The extent of the damage cannot be ascertained.

INDIANA

Petersburg—The Bicknell Coal Co., Bicknell, Ind., has leased 1100 acres of coal lands lying east of the city and will take options on several hundred adjoining acres. The shaft is to be completed within a year and the coal to be taken up within five years. The price paid for the coal is $35 an acre, with extra compensation for ground for tipple and yards.

Jeffersonville—More than half of the advance tows, with coal from Pittsburgh, were delayed by falling water in the Ohio and are tied up between this city and Cincinnati. Most of the coal that got through to this point went on to Memphis and New Orleans.

ILLINOIS

Worden—A suit for $8000 has been filed by P. K. Fornash against the Kerens-Donnewald Coal Co. It is alleged that the mine ventilation was poor and the air made the complainant ill so that he has been unable to work for several months.

Edwardsville—Before a board of arbitration here, working under the Illinois Workmen's Compensation Act, James Fry, of Worden, was awarded $3500 from the Kerens-Donnewald Coal Co. Fry was injured Nov. 22, 1912, when a prop in the mine struck him on the head. The wound appeared slight at first, but a month later he was stricken with paralysis and it was then discovered his skull had been fractured. He asked for a settlement under the Compensation Act.

Marion—Complete practical arrangements have been made for the connection at Du Quoin with the Southern Traction Co. of the Electric Traction Lines, extending westward from Harrisburg in Saline County from the coal fields east of here, and continuing on to Johnson City and across Franklin County to Du Quoin. This will give the coal-producing counties of Saline, Williamson and Franklin an electrically operated outlet into St. Louis.

O'Fallon—Illinois coal-hoisting records are believed to have been broken on Nov. 7, when the Nigger Hollow Mine No. 2 hoisted 4400 tons of coal in 7¼ hours. The previous record was held by a mine at Benld, Ill., which hoisted 4356 tons in 8 hours.

FOREIGN NEWS

Statistics for 1912 as to coal consumption are beginning to be made public by Latin American governments. Argentina imported 3,707,956 tons of coal, practically all of which came from the United Kingdom. Small shipments only were received from the United States. Mexico, which supplies considerable part of its needs from its own mines, imported 290,264 tons from the United States, 47,165 tons from Canada and 38,370 tons from the United Kingdom. On the other hand, Mexico exported 50,770 tons to the United States. This movement was entirely to Texas points in the immediate vicinity of some of the Mexican mines. Of the total imports of Porto Rico, the United States secured 42,986 tons. British shipments totaled 4327 tons. Of the imports for the Dominican Republic, the United States furnished 8635 tons, as compared with 1674 tons from Great Britain and 1407 tons from other countries.

Tegucigalpa, Honduras—A concession has been given to American interests for the exploitation of coal in the departments of Yoro, Atlantida and Colon. The concessionaire is allowed free importation of tools and machinery and material to carry on the work. Ten per cent. of the gross coal mined goes to the government in return for the concession.

Vancouver Island, B. C.—There is little change in the position at the mines of the Canadian Collieries (Dunsmuir), Ltd. The production at the company's Cumberland mines, for the month of October was 51,296 tons as compared with 52,187 tons in September. At the company's Extension colliery production continues between 200 and 300 tons a day, haulage facilities for a larger quantity still being unavailable.

The Pacific Coast Coal Mines, Ltd., operating at South Wellington, is arranging to increase its output from 200 to 300 tons a day. All coal being produced comes from No. 2 mine. Conditions in No. 1 mine since the miners stopped work six months ago became unfavorable for production, but a dozen men have lately been employed in putting the mine in shape to allow of an early resumption of coal mining.

PUBLICATIONS RECEIVED

Proceedings Mine Inspectors' Institute of U. S. A. Ninety-six pages, 6x9 in.; unillustrated. Copies have been sent to all mine inspectors in the United States and Canada. Inspectors not receiving a copy should write J. T. Beard, editor-in-chief of the Institute, 505 Pearl St., New York.

RECENT COAL AND COKE PATENTS

Gas Producer. J. A. Herrick, New York, N. Y. 1,075,566. Oct. 14, 1913. Filed July 10, 1911. Serial No. 637,615.

Heating Furnace—A. Glass, Wheeling, W. Va. 1,074,258. Sept. 30, 1913. Filed Feb. 8, 1912. Serial No. 676,466.

Feeding Device for Furnaces. J. Harrington, Riverside, Ill. 1,075,352. Oct. 14, 1913. Filed Mar. 7, 1912. Serial No. 682,139.

Steam Superheater. C. S. Hooper and R. C. Stevens, Erie, Penn. 1,074,792. Oct. 7, 1913. Filed May 11, 1912. Serial No. 696,574.

Steam Superheater. P. Thomsen, Cassel Wilhelmshoke, Germany. 1,074,300. Sept. 30, 1913. Filed Oct. 29, 1912. Serial No. 728,371.

Underfeed Stoker. W. C. A. Henry, assignor to the B. T. U. Co., Pittsburgh, Penn. 1,074,118. Sept. 30, 1913. Filed Apr. 15, 1912. Serial No. 690,762.

Soft-Coal Burner. P. P. Cooley, assignor to Culter & Proctor Stove Co., Peoria, Ill. 1,075,335. Oct. 14, 1913. Filed Nov. 18, 1910. Serial No. 593,066.

Mine Car Wheel—H. A. Holzer, assignor to United Iron Works Co., Springfield, Mo. 1,074,363. Sept. 30, 1913. Filed July 16, 1912. Serial No. 709,646

Fuel Economizer. E. B. Freeman, Dedham, Mass., assignor to B. F. Sturtevant Co., Boston, Mass. 1,074,855. Oct. 7, 1913. Filed Nov. 25, 1908. Serial No. 464,464.

Coal-Leveling Machine for Bee-Hive Ovens. J. H. Huhn, assignor to Covington Machine Co., a corporation of Virginia. 1,074,119. Sept. 30, 1913. Filed Feb. 6, 1911. Serial No. 606,827.

PERSONALS

R. T. Stewart, for some time mine manager for the Corbin Coal and Coke Co. in southeast Kootenay, British Columbia, has left that province for Brazeau, Alberta.

E. J. Quealy has returned to his home at Kemmerer, Wyo., accompanied by M. S. Kemmerer, of Mauch Chunk, Penn., who is interested in Mr. Quealy's Wyoming operations.

C. C. Johnston, who has been editor and manager of the "Coal Mining Review and Industrial Index," of Columbus, Ohio, for seven years, has severed his connection with the paper.

Nick J. Boylan, connected with the Pittsburgh Coal Co., for 12 years, has entered the employ of Pickands, Mather & Co., in their coal department. Mr. Boylan is one of the best known coal men on the lakes.

President T. H. Watkins, of the Pennsylvania Coal & Coke Corporation sailed for England this week accompanied by his son, C. L. Watkins, president of the Watkins Coal Co. They expect to be gone about a month.

Heinrich J. Freyn, formerly consulting engineer of the gas-engine department of the Allis-Chalmers Manufacturing Co., of Milwaukee, has recently joined the H. Koppers Co., of Chicago, in the capacity of third vice-president.

George Watkins Evans, consulting coal-mining engineer, of Seattle, has completed the examination of the Matanuska coal field of Alaska for the United States Navy. Mr. Evans will soon resume his private practice in Seattle.

Kingdon Gould, president of the Consolidated Coal Co. of St. Louis, and interested in the other Gould coal properties, has just finished a trip of inspection of the Gould mines in the states of Arkansas, Oklahoma, Kansas, Missouri and Illinois.

W. R. Riggleman has been appointed district mine inspector of District No. 1 of West Virginia, succeeding Carl F. Schoew, resigned. Mr. Riggleman has been connected with the Davis Coal Co. at Thomas as mine foreman, and is a well known coal man.

N. M. Rice, on Nov. 15, becomes purchasing agent of all the Frisco Lines, with headquarters in St. Louis. Mr. Rice will assume the duties of the fuel agent in the purchase of all fuels. He comes to the Frisco from the Santa Fé, where he was store keeper.

Robert V. Rex, Superintendent, of Continental No. 2, of the H. C. Frick Coke Co., has been appointed superintendent at Leisenring No. 3 to succeed A. R. Miller who resigned. Mr. Rex will be succeeded at Continental No. 2 by Samuel Brown, of the Standard plant of the H. C. Frick Coke Co.

Amos Godfrey, who has had charge of the British Columbia Anthracite Co.'s field operations in the Groundhog coal basin, in the northern part of Skeena district, has returned to Vancouver, B. C. Two seams of good coal, one of 7 ft. and the other of 4 ft. 6 in., are stated to have been opened by last season's prospecting work.

D. B. Dowling, of the Geological Survey of Canada, who has done much geological field work in the eastern part of the Rocky Mountains in Alberta, especially in connection with the extensive coal measures, recently left Ottawa for the vicinity of Okotoks, some 30 miles south of Calgary, where it was lately reported oil had been found.

Ben W. Robinson, who recently resigned as general manager of the Victoria Coal Co., at Earlington, Ky., has removed to Equality, Ill. He becomes president and general manager of a company which has been organized to open and equip a new operation in that field. A new mine, which will tap a hitherto untouched body of coal, is to be opened.

John Mitchell, former president of the United Mine Workers of America, will resign his office with the American Federation of Labor, with which he has been connected for 15 years. Mr. Mitchell made this announcement at a banquet in his honor at Butte, Mont. He said that his withdrawal was voluntary and would be formally made at the meeting of the Federation in Seattle.

Oscar W. Schell, division superintendent for the Delaware & Hudson Co., since the death of E. R. Peckens, whom he succeeded eleven years ago, has tendered his resignation to the company. The company tried to have him reconsider his determination to quit, but he refused as he has something better in view. Charles Considine, an outside foreman at Providence, near Scranton, has been appointed to succeed Mr. Schell.

OBITUARY

Joseph J. Jones, district superintendent of the Lehigh Valley Coal Co., died recently at his home, 388 North River St., Wilkes-Barre, Penn., following a weeks illness. He was aged 63 years, and was one of the mining experts of the Wyoming Valley. Mr. Jones had been foreman at the Dorrance, Prospect, Parsons, Midvale and Oakwood collieries for more than thirty years.

CONSTRUCTION NEWS

Forksville, Penn.—A coal breaker having a capacity of 400 tons daily is being constructed at this place.

Poland, Penn.—A contract has just been awarded A. K. Jenkins & Co. for the erection of a large coal tipple and bin for the Poland Coal Co.

Houston, Tex.—The Southwestern Steel Development Co. has consummated arrangements insuring the construction of an extensive plant to include iron furnaces, steel mills, coke ovens, etc., at Texas City.

Roanoke, Va.—Orders have just been placed for the materials necessary for the construction of 1000 all steel hopper cars at the Roanoke shops of the Norfolk & Western, and work will be begun as soon as other orders that precede this have been completed.

Sturgis, Ky.—Allen & Garcia, of Chicago, are installing at the West Kentucky Coal Co.'s mine No. 9, the largest shaker screens in western Kentucky. The screens have a greater capacity than any which have been set up in that part of the state. Work will shortly be completed on the screens and the other equipment being installed at the mine, and shipments will begin at an early date.

Philadelphia, Penn.—Coal exports from this port during the month of October were exceptionally heavy. They totaled 104,591 tons of bituminous coal and 5891 tons of anthracite. In October 1912, there were shipped from here 78,512 tons of bituminous and 7666 tons of anthracite. Last month's gain was 25,019 tons in the bituminous trade and a loss of 1775 tons of anthracite. In September the shipments aggregated 82,963 tons of bituminous and 6148 tons of hard coal.

Uniontown, Penn.—A new coal concern to be known as the Strange Creek Coal and Coke Co., is being formed to operate 4000 acres of Strange Creek, West Virginia coal, owned principally by Fayette County people. The officers of the company are all Uniontown men. A committee of seven was appointed to secure a charter from the state of West Virginia and proceed immediately to complete the incorporation. The coal land comprising this tract has railroad frontage on the Mead and Spear R.R., also the Coal and Coke R.R., while the Baltimore & Ohio has a branch within two miles of the property.

Cairnbrook, Penn.—The Pennsylvania R.R. spur to Cairnbrook, the coal town of the Loyalhanna Coal and Coke Co., has been completed, and the work of loading several thousand tons of coal that was stored while the headings were being driven is progressing rapidly. The spur to the Cairnbrook mines is being extended to the Dark Shade Creek to a new opening that is being made about a half mile away by the Wilmore Coal Co. From the new Berwind-White holdings the spur leads to holdings of the Logan Coal Co., where a new opening is being made. The "B" and "C" seams in all of these operations are being worked. The Berwind-White and Consolidation Coal Co. own lands on different sides of the Shade Creek, near Central City, and as a result of operations that are contemplated there much interest has been manifest in real estate circles recently.

NEW INCORPORATIONS

Clarksburg, W. Va.—The Templeton Coal Co. has been incorporated with a capital stock of $25,000, to develop coal mines.

Gadsden, Ala.—The Little River Mining Co. has been incorporated with a capital stock of $4000, to develop coal mines near Gadsden.

Wilburton, Okla.—The Howard Bros. Coal & Mining Co. has been organized with a capital stock of $1000. The incorporators are: John, William and Richard Howard, of Wiburton.

Oklahoma City, Okla.—The Carson Mining Co. has been organized with a capital stock of $25,000. The incorporators are: John Hart, L. M. Owen, and D. F. Peyton, of Oklahoma City.

Cleveland, Ohio—The National Peat Co., of Cleveland, Ohio, was recently granted a charter under the laws of Delaware, with a capital stock of $500,000. Robert O. Bartolomew, of Cleveland, was chief incorporator.

Nelsonville, Ohio—The Clifton Coal Co., of Nelsonville, Ohio, has been incorporated with a capital stock of $10,000, to mine and deal in coal. The incorporators are George W. McKee, Wilbur McKee, A. B. Ailes, Julius Fisher and George W. Lowery.

Sutton, Ky.—The Funk Coal Co. has been organized for the purpose of mining coal. The capital stock is $25,000, and the incorporators are: H. H. Funk, Belle Musick, of Toler, Ky.; A. J. Younce, of Sutton; Thomas West and J. R. Barbour, of Williamson, W. Va.

Columbus, Ohio—The Northern Mining & Fuel Co., of Columbus, Ohio, has been incorporated with a capital stock of $10,000, to mine and deal in coal. The incorporators are H. B. Halliday, A. T. Seymour, Lowry F. Sater, C. E. Richards and E. T. Bunker.

Camden, N. J.—The Coisa Portland Cement Co. has been organized with a capital of $160,000. The objects of the incorporation are to mine, quarry and sell limestone, shale, coal and all kinds of minerals. The incorporators are John D. Stevenson, 3d, William J. Montgomery, and H. B. Martin.

INDUSTRIAL NOTES

Martins Ferry, Ohio—The Beech Flat Coal Co. has recently installed a large steam shovel for stripping the overburden from its coal.

Uniontown, Penn.—The Mt. Hope Coal Co., of Uniontown, has sold its plant and holdings, consisting of 185 acres of coal and 150 coke ovens at Lynn Station, to the People's Coal Co., of Pittsburgh.

Columbus, Ohio—Suit has been filed by the Gibson-Spence Coal Co., of Columbus, Ohio, against the Clarion Coal Co. for a receiver. The Gibson-Spence Co. claims to be holder of two notes amounting to $1177.

Wellsburg, W. Va.—The Bowman coal property was recently sold by the Wellsburg, Bethany & Washington R.R. Co. to Guido Bros. The mine is a new one and is located at the foot of Buchannan's Hill on Bethany Pike.

Pomeroy, Ohio—The Dixie Salt Works and coal properties at Mason, W. Va., was sold at receiver's sale at Pomeroy recently by Referee E. R. Titus to George Schlaegel, for $30,650, Mr. Schlaegel represents the Pomeroy Products Co., which was formed for taking over the Dixie properties.

Washington, D. C.—The coal exportation of continental United States for 1913 will probably approximate $100,000,000 in value according to figures of the Bureau of Foreign & Domestic Commerce. This puts the United States in the third place among the coal exporting countries of the world, being exceeded only by the United Kingdom and Germany.

Columbus, Ohio—The Kanawha & Michigan Ry.'s joint ownership by the Lake Shore and Chesapeake & Ohio must cease, according to a decision handed down, Nov. 11, in the United States Circuit Court. The opinion was in the suit of the Government against the companies for alleged monopoly of coal carrying facilities from the Hocking coal regions.

Columbus, Ohio—The Ohio Utilities Commission is watching with zealous eyes the recent advances in the price of coal in Ohio with a view to bringing proceedings against the operators in case it can be proven that there is a coal monopoly in the Buckeye State. To that end investigators have been sent out by the commission to ascertain the facts in the matter.

Operators in Ohio are not in the least freightened over the prospects of prosecution as they claim there is no semblance of a combination among the various operators of the state. They say the price of coal depends absolutely on the car supply and the demand for all grades and is not an arbitrary matter.

Another thing being investigated by the commission is charges of favoritism in the distribution of cars. It is claimed by some operators that more cars are furnished for interstate traffic than for traffic within the boundaries of Ohio.

Pittsburgh, Penn.—In approximately 100 years since coal mining began in the United States the country has produced 9,275,000,000 tons, of which Pennsylvania has mined 4,913,000,000 or 53%. No other one state has mined as much as 1,000,000,000 tons, Illinois being the nearest with 903,900,000 tons. Furthermore, the production of Pennsylvania for the last four years which stands at 935,500,000 exceeds the total production of Illinois since coal mining began in that state in 1833.

COAL TRADE REVIEWS

GENERAL REVIEW

Fall in temperature causes a rush for hard coal; trade active and few concessions to be had. Bituminous weak in spots, particularly in Coastwise business. Consumers showing a lack of interest and some price cutting is noted. Operators making a determined effort to hold the market. Effects of the heavy weather in the Central States.

An unexpected storm of almost mid-winter severity has started a rush of small buyers into the hard-coal market and created a note of urgency in the situation. The improvement is apparent in both wholesale and retail. Concessions on the regular company circular are still to be obtained on certain grades, notably egg size, but as a rule the demand is heavy all along the line and there are even rumors that some companies have already been forced to draw upon reserve stocks. Lake shipping is relatively light.

Bituminous continues to show a weakening tendency although firm in spots. The Atlantic Coastwise business particularly, has fallen off heavily, and supplies are beginning to accumulate at the principal loading piers. The trade is conspicuous for the lack of interest in spot business and indications are that there will be a light demand for several weeks to come. Large tonnages are available and some price cutting is noted where it is found necessary to move coal promptly. Supplies at tide are larger and prices are being maintained only because of the fact that most of the production is well covered by contracts. Inquiries are only scattering but in the face of all these adverse conditions, operators are making a determined effort to hold the market in hopes that it will swing back to its former activity as seems probable under the change in weather conditions. The New York market has as yet failed to show any specific weakness although there is a slowing down which will probably continue until the first of the year.

The heavy storm in the Pittsburgh district created a sharp rush for domestic coal on which premiums were already in effect so that some fancy prices were obtained for prompt tonnages; on the other hand manufacturing demand is restricted, while lake shipping is slowing down, due to the lack of vessels as a result of the slow movement of ore. The heavy weather on the Lakes resulting in the loss of a number of vessels, has demoralized shipping temporarily and will tend to retard the last rush of coal to the Northwest.

The domestic trade in Ohio is active, the demand for all grades continuing heavy and prices showing a strong upward tendency. The car supply is still a ruling factor in the situation there and this has been further aggravated by the severe weather. The movement at Hampton Roads is about normal in all directions and there is a good supply of vessels. There is a fair accumulation at the piers but some shippers are still having difficulty in getting sufficient tonnage; coastwise business is mostly to New England. The Southern market is easier, the rise in the river having relieved the tension on Northern coals.

Prices in the Middle West are generally strong but fluctuate considerably. The recent touch of real winter stimulated the market perceptibly and checked the tendency to ease off. Operations continue heavy, any delay being due to poor car service rather than lack of orders. The situation locally looks encouraging.

BOSTON, MASS.

Dull market for Hampton Roads coals. Rumors regarding English syndicate in New River and probable labor troubles. Demand promises to be light for weeks to come. Georges Creek output likely to be curtailed for the present, and Pennsylvania grades show weak tendencies. Anthracite a shade easier on account of mild weather.

Bituminous—There are only a few relieving phases in the generally dull situation on Pocahontas and New River at tide. Some of the agencies have moderate business in prospect and are therefore quoting $2.90 f.o.b. for delivery 30 and 60 days hence, but most of the shippers are eager for such orders as can be had at the season basis of $2.85. There is, however, a notable lack of demand for spot coal, and supplies are beginning to accumulate at all the loading piers.

There is a good deal of talk regarding the rumored optioning of various West Virginia properties, principally in New River, by an English syndicate, but so far nothing tangible has been given out. If there is basis for the story and the deal should be carried out it would undoubtedly mean a reduced supply of Hampton Roads coals for New England. Any foreign purchasers would be sure to divert larger tonnages for export and such a development would work an important change with respect to this market.

Some apprehension over labor troubles in the spring in the same districts is being felt now and then. A determined effort seems likely to be made next season to organize both the Pocahontas and New River fields. This aspect of the situation will be watched with increasing interest as the season advances.

Spot coal for inland delivery continues rather a drug on the market. Prices are still off and there is a conspicuous lack of interest all over the territory. The storm on the 8th and 9th will doubtless shorten up shipments from West Virginia for a few days but from present indications the demand is going to be light for several weeks to come. Georges Creek shares in the situation on Pocahontas and New River. There are large tonnages available at all the distributing points, but since most of this grade is placed on a contract basis there has been no wavering in price. November, however, will probably show a materially lessened output.

The better grades from the Pennsylvania districts are on an easier price range than a week ago. At the same time, operators are trying to hold quotations in the hope that the market will swing back. There is little inquiry here and many are looking for a decided break. There is no apparent change in the dull outlook for the cheaper grades; f.o.b. New York there is a dearth of business outside of the bunker trade. All-rail coal is quiet, with only scattering inquiry. Consumers are well-stocked and requests to defer deliveries are far more frequent than orders.

Anthracite—The situation continues strong, although stove size does not seem in quite the short supply that was looked for. The mild weather has had some effect on the market and premiums this week f.o.b. New York have not been so general; 25c. is being paid in instances where a large proportion of stove is required, but egg and chestnut with individual shippers are barely holding to the circular. Barge rates out of New York are still at 65@70c. and the trade east of Cape Cod is therefore looking largely to Philadelphia for current supplies. Tows are moving more regularly and quite a fleet has sailed the past week from the Delaware for Eastern points. Ten days more will see the end of shipments up the rivers.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.00@1.55	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.25@2.80	2.50@2.90	2.92@3.02	
New York*	2.55@3.10	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.75@3.88
Providence†				3.77@3.83

*F.o.b. †On cars.

NEW YORK

Hard coal active with indications that some sizes will shortly be out of the market; colder weather started a rush in retail. Soft coal in strong demand, but with an uncertain future. A tendency to slow down.

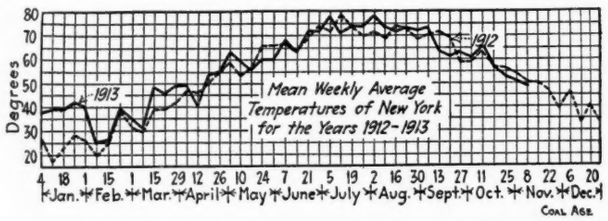
Anthracite—The local market on hard coal is strong all along the line with the possible exception of egg size. This grade continues to be difficult to move and many subterfuges are resorted to to dispose of it. The demand for stove exceeds the supply; a continuation of the prevailing cold snap will see stove coal entirely out of the market shortly. In the steam grades, business is good on all sizes, there being a tendency toward higher prices on pea coal.

The fall in temperature the early part of the current week had a notably stimulating effect upon the retail end of the business. Buying opened up freely, and the demand is insistent. The water movement out of New York Harbor is about normal. The car shortage in the mining regions has improved materially and now just about meets requirements, although not entirely satisfactory yet.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	.....	$4.95	
Egg	5.25	$5.15@5.25	5.20	$5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.40@3.50	3.45	3.35@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25	1.95@2.20	1.75@2.20
Barley	1.75	1.75	1.70	1.50@1.70

Bituminous—The recent storms have steadied up the soft-coal market and had a tendency to check the downward trend, but there is still a note of hesitancy and many think that the trade will continue slow during the balance of the year. It is a notable fact, however, that conditions locally maintain a generally better tone than at most of the other large distributing centers. The advent of winter weather,


Degrees
80
70
60
50
40
30
20
1913
1912
Mean Weekly Average Temperatures of New York for the Years 1912-1913
4 18 1 15 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 11 25 8 22 6 20
Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec.
Coal Age

the slowing down of the movement and the possibility of a strike next April are the favorable conditions in the market against which is the serious contraction in general business and industrial activity, and the release of the large tonnages now going into the Lake business. The outlook rests entirely on the developments along these lines, and from present indications may go either way, the balance probably being slightly in favor of the producers at the moment.

The high volatiles are the heaviest and the most difficult to move, the better grades still being rather scarce and firm. The labor supply is better, the colder weather driving more men from outside vocations into the mines. Cars are generally in good supply on both the Pennsylvania and New York Central, but the situation on the B. & O. has been tight. More than the normal supplies are reported at tidewater, but the demand continues good and prices are being firmly held. We continue New York quotations on the same basis as last week as follows:

West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2.85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

BALTIMORE, MD.

Bituminous demand fallen off heavily and market weakening. Some price cutting to move coal promptly. Supplies at tide much larger. Car movement better.

Mild weather has depressed the anthracite trade here for the past week or ten days. There was a brief period of activity with the close of October, and while business is not dead by any means, it is not as brisk as many had expected The soft-coal trade is struggling with a falling market. Demand has fallen off greatly, the steel and cement industries have cut off shipments on contracts, and the movement of coal to the Northwest has been curtailed.

The better-grade coals, which until 10 days or so ago had held firm, are now notably weaker. The high-grade Pennsylvania steam coals that had recently sold up to $1.45 and $1.50 are now to be had around $1.30 and $1.35. The lower-grade West Virginias are bringing about a dollar, which is also the prevailing price for slack. Three-quarter gas is offering as low as $1.05, which is a big reduction from the figures obtained during the height of the Lake season.

There is more coal at tide here the past week than for some time past, due to an exceptionally free car movement, and some sacrificing was done in a few cases. The movement over the piers on export was rather light, and the up-coast shipments on contract coals were only moderate.

PHILADELPHIA, PENN.

Anthracite trade continues to show improvement, with activity more marked as the season advances. All sizes but egg moving well. Bituminous trade lacks tone, but prices well maintained.

The past week has seen considerable improvement in the anthracite coal trade, both from a retail as well as wholesale standpoint. The demand for chestnut size has increased to such an extent, that it is understood the large operating companies have started to work on their storage piles, and with the inception of real winter weather, it is confidently expected that the lethargy in egg, which is about the only size that is dragging at present, will show marked improvement. One still hears of concessions, however, in egg, chestnut and pea sizes, in some cases as much as 35c. in the egg, and dealers claim that they can secure all they want at less than circular. There is no disposition, however, on the part of the large companies to meet this situation, circular prices still being maintained, their strength lying in the fact that orders for stove coal, which is far behind the market, must be accompanied by orders for the other sizes, and in this way, the production is being well taken care of.

Pea coal is beginning to feel the result of the winter consumption. This is particularly true of Philadelphia and vicinity, where large quantities of this size are used. The one- and two-ton lots are commencing to be heard now, which, after all, constitutes, in a large measure, the bulk of the business, and practically marks the beginning of the active season. Production is on about a parity with last year, with the usual crop of petty differences in the various mining regions. This has a tendency to reduce the output when it is needed the most, which is probably an effectual argument, from a miner's standpoint.

There seems to be a tendency to softness in the bituminous trade. It is claimed that the labor situation has about adjusted itself, resulting in an increased output, and as a consequence, while prices remain about the same, there is a more urgent quest for orders. They are not coming as easily as has been the case for months past, and salesmen are sent out with instructions to get business. It is slowly approaching its natural level.

BUFFALO, N. Y.

Market quiet. Movement on contracts the best feature. Serious break may occur unless more seasonable weather develops. Coke weak. Lake shipping of anthracite active.

Bituminous—The market is weak, but shippers will not make any price concessions, for they do not believe the business could be stimulated in that way. The consumer is indifferent to the market. One operator reports that an increased supply of cars has added to the weakness of the situation; he is able to run his mines at full capacity, although that is largely because a great part of his output is sold on contract. There was recently much regret because so much coal was contracted, but if anything pulls the market through now it will be this very feature. Some sellers wonder why the trade now is less than in June and July; the reason is that many industries reduce operations at this time, and if the weather does not create a demand, it must necessarily be slack. It is generally agreed that a snow storm would firm the market quickly.

The jobber and consumer anticipate a break in the market, while the producer fears the same, and looks to the weather as the one element in the trade that is most likely to prevent it. Prices are, therefore, weak at former figures, $2.90 for Pittsburgh select lump, $2.80 for three-quarter, $2.65 for mine-run and $2.25 for slack, the latter still being much firmer and scarcer than sizes. Allegheny Valley coal is about 25c. lower than Pittsburgh.

Coke—The market has shown additional weakness during the week, and all grades have been offered at reduced prices. Prices rule at $4.70 for 72-hr. Connellsville foundry, $4.20 for 48-hr. high-sulphur furnace, and $3.60 for stock coke.

Anthracite—There is little activity in anthracite except for lake shipment. After Dec. 1 the small amount shipped will have to pay an increased insurance rate and quite likely a higher freight. In spite of the need of more anthracite in the Northwestern trade, shippers were able to load only 124,000 tons into vessels during the week. The local demand for anthracite is light.

PITTSBURGH, PENN.

Pittsburgh district visited by great wind and snow storm crippling telegraph lines and railroads. Manufacturing demand for coal slightly decreased. Pressure to maintain lake shipments. Connellsville coke quiet and slightly lower.

Bituminous—Last Sunday the Pittsburgh district was visited by a wind and snowstorm, which would be noteworthy at any time in winter, while as making the first snowfall of the season over a foot it was altogether exceptional. A sharp increase in the demand for domestic coal resulted in a market which was already showing premiums, and some fancy prices were paid for a limited tonnage. The manufacturing demand for coal has decreased a trifle further, as the iron and steel industry is steadily slowing down. Lake shipments have been temporarily much reduced as the first cold snap, even if a mild one, always ties up the railroads more or less, and when telegraphic communication is practically suspended, not much can be expected from the railroads

in moving freight. A further incentive is furnished to prolong the Lake shipping season to the end of the month, but a difficulty is experienced in finding vessel room, as the ore shippers have greatly curtailed operations, October ore shipments showing a decrease from last year, while only a little is to be moved this month, and some shippers are already through. We continue to quote prices for short contracts and for prompt, subject to premiums for small lots of domestic, as follows: Slack, $1@1.10; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Connellsville Coke—The sale of 10,000 tons of furnace coke at $1.90 a trifle over a fortnight ago, which sale marked the break of the Producers' Coke Co. from its $2.50 price, is shown now to have fixed the maximum of the market. Several lots of November and November-December coke have been sold at that figure, and last week a sale of 15,000 tons of standard furnace coke was made at $1.85. This price can easily be done on prompt lots, but there is no further demand. As to contract, there is no negotiation whatever, but it develops that some time ago, when the majority of operators were holding strongly for $2.50, a contract was made at $2.25 for the first half of 1914. In the absence of bids and offers this might technically be held to constitute a normal market. Foundry coke has weakened in sympathy with furnace coke. We now quote: Prompt furnace, $1.85; contract, nominal, $2.25; prompt foundry, $1.65@1.75; contract foundry, $1.65@1.75 per to.. at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 1 at 375,230 tons, a decrease of 10,440 tons, and shipments at 356,522 tons, a decrease of 32,522 tons.

COLUMBUS, OHIO

Unusual strength, the chief characteristic of the local trade. All grades are in good demand and the car supply is getting worse. Prices are firm and inclined to advance. Lake trade is still active.

Market conditions in Ohio are ruling firm in every respect and the tendency is upwards. The demand for all grades remains steady and no stocks are sold below the circular. Car shortage is still the chief factor in the trade. The supply is about one-half normal and in some cases the percentage is even lower than that. In the Hocking Valley field it has required considerable work on the part of railroads to furnish 50 per cent, while in Eastern Ohio and Pomeroy Bend the percentage is lower. The strictly domestic fields have suffered with the remainder of the producing sections of the state.

The domestic trade is probably the strongest point in the market. Dealers in Ohio and adjoining states are trying to accumulate a surplus to be on the safe side when the rush incidental to colder weather comes. As a result they have placed larger orders and are insisting upon immediate delivery. Delay in delivering runs from a few days to several weeks. One of the chief causes for the car shortage is the lack of motive power on the part of railroads. Retail stocks are only fair in this section and domestic orders are coming in well.

Lake trade is still a factor in the situation although it is not long until the close of navigation. The dockmen of the Northwest want as large a tonnage as possible rushed through, to prevent a large all-rail movement. As a result, every effort is being made to secure a good lake movement which is shown by the records of the loading machines at the docks of the lower lake ports.

Steam business is holding up well. Manufacturing establishments while not consuming a larger tonnage are placing more orders so as to guard against a fuel famine. As a result stocks are growing gradually larger. Railroads are using quite a large tonnage in their freight movement.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$2.00 @ 1.90	.....	$2.25 @ 2.15	$2.00 @ 1.90
3-4 inch	1.85 @ 1.75	$1.50 @ 1 40	2.00 @ 1.90	1.85 @ 1.75
Nut	1.30 @ 1.20	.....	1.75 @ 1 65	1.40 @ 1.35
Mine-run	1.50 @ 1.40	1.35 @ 1.30	1.50 @ 1.40	1.50 @ 1.45
Nut, pea and slack	0.90 @ 0.85	.....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.75 @ 0.70

DETROIT, MICH.

Car supply worse than was anticipated. Situation hinging on this feature. Domestic coals quiet due to unseasonable weather.

Bituminous—As was anticipated, the car supply has at last become the controlling feature in the situation here. Conditions are even worse now than was expected and shippers are being taxed to the limit to meet their contracts. Reports from some districts place the car supply as low as 20%.

There are very few cars of free coal on track here. Prices are firm on all grades, with the exception of certain sizes of Hocking, which have shown signs of weakness. West Virginia nut and slack are quoted at 90c., with mine-run, both for spot and contract, at $1.15. There is very little new business being done in domestic coal, due to the unseasonable weather recently. Conditions have improved in this respect, however, and prices are showing a rising tendency.

The market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.65	....	$2.00	....	....	$2.75	$2.50
Egg	1.65	....	2.00	....	....	2.75	2.50
Nut	1.50	....	1.65	....	....	....	....
Steam lump	1.50	....	....	....	....	....	....
¾-in. lump	1.35	$1.35	1.35	$1.35	$1.35	....	....
Mine-run	1.25	1.15	1.15	1.15	1.15	1.50	....
Slack	0.90	0.95	0.65	0.90	0.90	....	....

Anthracite—Shipments are coming in better than was anticipated, and the supply of stove coal is greater, although there are now indications of a surplus.

Coke—Connellsville coke has taken a sharp slump in the local market. Foundry coke is being quoted at $2.50, f.o.b. ovens, while Semet Solvay and gas house remain unchanged.

HAMPTON ROADS

Movement during week only about fair. Piers well supplied with bunker tonnage. Prices stationary, although demand is heavy.

The movement of coal from Hampton Roads piers during the past week has only been about normal. There has been a good supply of bunker vessels and also some large cargoes moving from tidewater but no extra heavy shipment. Foreign shipments have gone to Canal Zone, Kingston, Havana, Cienfuegos and Rio de Janeiro. Practically all of the coal moving coastwise has gone to the New England market, about the largest percentage being consigned to Boston and Providence. The coal moving both coastwise and foreign has been principally Pocahontas and New River.

Prices have changed but little during the week, remaining about the same as they have been for the past ten days or more. There is a fair accumulation of coal at tidewater piers, although a number of the shippers are short and have had difficulty in getting sufficient coal forward to take care of contracted tonnage on hand.

LOUISVILLE, KY.

Colder weather has had a reviving influence on the trade. Heavy river shipments relieving the shortage in this department. Price advance anticipated.

The car shortage and the Election holiday of last week affected production to such an extent that the fear of an oversupply has been eliminated for the time being. Colder weather has also had its effect upon the situation, and the market is notably stronger. The rather backward season, up to the recent cold snap, was having a depressing effect upon the outlook. Heavy rains in the upper Ohio Valley have opened up river transportation and large tonnages are now en route for this district. The companies handling river coal have been so hard pressed that they have occasionally been compelled to resort to the local rail products.

The heavy demand for eastern Kentucky coal in the North still continues, and will no doubt increase as the season advances. The only uncertain factor in this trade is the limited supply of gondola equipment, which is the kind most commonly required. The new "battleship" cannot usually be applied on this business. An advance in quotations effective Nov. 15 is being discussed; $2.50 f.o.b. mines will probably be the new price on block coal, with the lower grades ranging down at the customary differential. At the moment, orders are plentiful at $2.35, at which figure the dealers claim they are unable to make any profit because of the low-priced contracts they have with consumers.

The over-supply of screenings in this market seems to have been eliminated at last. Colder weather has caused the heating plants generally to come into action, so that there is a large healthy consumption at the moment. The western Kentucky market is more active than for some time, and the steam grades are particularly strong.

BIRMINGHAM, ALA.

Steam coal shows slight improvement. Due to cold weather, domestic is also in a more healthy demand. Blacksmith normal and furnace and foundry coke quiet. Pig iron more active. Car supply still short of requirements.

The steam coal market shows a slight improvement over last week, though it could not be called in a good condition. The demand is slightly better, with prices about the same. Following in the wake of a cold snap, domestic coal shows quite an improvement, with a large increase in the demand. While some of the higher grades have been sold up for

some time, the lower grades have suffered for want of orders, but the cold weather is bringing out the inquiries for it.

Blacksmith coal is moving satisfactorily, the demand gradually increasing from week to week. Very little is doing in either furnace or foundry coke, but the prices are holding up. Pig iron is more active, and while the sales are not large, the price is holding $11.50 2Foundry being the basis.

The car supply is still short of the requirements, especially on the Southern Railway and no great improvement is looked for in the near future.

NEW ORLEANS, LA.

Falling off in shipping affects coal consumption decidedly. Exports to Latin America increase. Cane mills are requiring more coal this year.

Compared with this week last year, coal consumption took a decided slump, due to the difference in the harbor demand. Owing to the slowness with which the cotton crop is being marketed, there is little activity in shipping. High ocean freight rates have practically stopped the lumber movement. Domestic demand is good. Exports to Latin America have been much heavier, while the cane mills are laying in large supplies in anticipation of one of the longest grinding seasons in many years.

Much of the tension evidenced in the local market has been relieved by the unusually early rise in the Ohio, which assures relief to the fast dwindling stocks held by the Northern companies.

In order to be assured that everything is being done to make this port the principal coaling supply station for the Panama Canal and Latin America in general, the Association of Commerce is investigating conditions. Owing to the very unusual circumstances existent here, none of the local interests are in a position to gage future action. The whole situation hinges on the possibility of bringing Alabama coal to this port by water.

INDIANAPOLIS

Expectation of mild weather in Indiana and perhaps lower prices not realized. Mines are running full time except when interrupted by car shortage, which is not serious. Prices hold steady.

It was expected the continuance of mild weather would have a distinct effect on the coal industry of Indiana, in volume of trade if not in weakening prices. It has not done so, however, and the recent taste of real winter put an end, at least temporarily, to those misgivings. Operations at the mines have kept up well, most of them being on full schedule; delays are due entirely to the car situation and not a lack of orders. However, less is being said about car shortage. It is still a factor, especially with the Big Four, but operators have long been used to that and plan their business methods accordingly.

A street-car strike in this city for eight days, during which no cars moved and which stopped interurban traffic at the city limits had a paralyzing effect on business generally. This included the largest consumers of coal, the power houses of the city and interurban lines. Prices hold steady at the mines and retailers of the city let the first of the month go by without changing their quotations, which remain at the basis fixed Sept. 20.

CHICAGO

Prices for steam coal higher. Drop in domestic ranging from 10c. to 25c. a ton. Car supply still inadequate. Western coals a trifle weak, Springfield producers cutting some prices as much as 10c. a ton.

Additional strength in prices for steam coal and a decline in quotations for domestic are the leading features in the Chicago market. It may be said, in addition, that the general business outlook is causing operators considerable worry.

There has been a drop in domestic coal prices ranging between 10c. and 25c. a ton, while an advance of from 5c. to 10c. a ton has been noted in the steam grades. Although idle coal cars are increasing in number, the car supply remains unsatisfactory, due chiefly to a lack of expeditious car movement. Western coals are somewhat weak, Springfield operators cutting prices in some instances as much as 10c. a ton. Springfield domestic lump is selling in Chicago at from $1.60 to $1.65 with the country price remaining at the circular figure of $1.75. Domestic sizes from the Franklin County field are selling at from $2 to $2.25. Operators who are oversold are adhering to the $2.25 quotation, while others whose orders are not so plentiful are shading.

The price for Carterville lump, egg and No. 1 washed remains at $2, the mines, warmer weather, apparently, having failed to influence the operators in that region. Dealers in Hocking coal are still complaining about insufficient service by the rail carriers. Prices, however, remain unchanged with comparatively little of this fuel coming all rail to the Chicago market. Smokeless lump and egg are stronger and the price for mine-run a trifle easier; the general figure for the latter is $1.40, the mines, although some sales have been reported at $1.50. Lump and egg are quoted in Chicago at $2.25, the mines. In the country districts sales are made on the basis of $2.50.

The movement in furnace and foundry coke is fair, but spot sales are small in volume. On account of weather conditions there has been a decrease in the movement of by-product coke. The market for screenings is improving.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1.22	1.55@1.80	1.12@1.22	

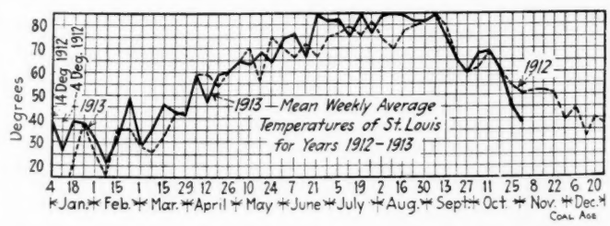
Quotations on Harrisburg coal are: Domestic lump and egg, $3.05; steam lump, $2.65@2.80; mine-run, $2.40@2.55; screenings, $1.55@1.80; No. 1, nut, $1.75@1.80; No. 2 nut, $2.55@2.80. Carterville prices are: Lump, egg and No. 1 washed, $3.05; No. 2, washed, $2.65.

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg and stove, $4.90@5; byproduct, nut, $4.95@5.10; gas house, $4.95@5.

St. LOUIS, MO.

Car supply conditions improving and plenty of domestic coal. Weather conditions keep prices irregular. Steam sizes looking up.

Irregular weather has kept the market in a somewhat uncertain condition. For one or two days last week prices were inclined upward but they would drop back again. Indications the early part of the week were that the market would be likely to stiffen up some, although if the car supply for the next week is as good as it was last week there


Degrees
80
70
60
50
40
30
20
14 Deg. 1912
4 Deg. 1912
1913
1912
1913—Mean Weekly Average Temperatures of St. Louis for Years 1912–1913
4 18 1 15 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 11 25 8 22 6 20
Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec.
Coal Age

will be plenty of coal. All of the railroads did better the past week than they have for some time.

Steam coal has picked up some, especially from the Carterville field, and screenings are easily bringing from 50 to 60c. Standard screenings, however, are floating along from 15 to 25c. The standard market is still too low to be profitable for operators, although Carterville is doing exceptionally well. On foreign coals everything is quiet.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump				$1.05@1.15
3-in. lump			$1.50	
6-in. lump	$1.75 @ 2.00		1.60	1.35@1.50
Lump and egg	1.85 @ 2.15	No quotat'n		
No. 1 nut	1.60 @ 1.75			
Screenings	0.40 @ 0.50			0.10@0.20
Mine-run	1.10 @ 1.20			
No. 1 washed nut	1.85 @ 2.00		1.40	
No. 2 washed nut	1.50 @ 1.65		1.60	
No. 3 washed nut	1.15 @ 1.20			
No. 4 washed nut	1.00 @ 1.10			
No. 5 washed nut	0.50 @ 0.60			

KANSAS CITY, MO.

Market steadying up under the influence of more seasonable weather conditions. Inadequate gas supply a factor in the situation.

The market has been weakening somewhat under a steady stretch of warm weather, but is now showing signs of stiffening as the weather conditions become more favorable. The Indian summer has given way to more seasonable weather, and prospects are for better conditions the remainder of the year. The warm weather resulted in no changes in quotations, but operators were inclined to concede something in order to keep their output moving. Others took advantage of the lull in order to pile up stocks in anticipation of a higher market a little later.

Cold weather has had a settling effect and all lines are now moving briskly. Kansas nut, which has been weak, has

braced up well, while block coal, also showing little life, responded immediately to the cold wave. Should the weather continue cold, the expected advance of 25c. will go into effect around Thanksgiving. Inquiries are coming from all sections of Kansas and Missouri, because of the unsatisfactory natural gas situation.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for October and the first ten months, of the years 1912-13, in long tons:

	October		10 Months			
	1913	1912	1913	%	1912	%
Phila. & Reading....	1,232,367	1,434,923	10,736,917	18.64	10,385,395	20.17
Lehigh Valley.....	1,162,850	1,217,297	10,834,778	18.80	9,505,104	18.46
Cent. R.R. N. J.....	906,525	938,297	7,701,931	13.37	6,769,128	13.14
Del. Lack. & West..	895,252	970,139	8,253,236	14.32	7,325,085	14.22
Del. & Hudson.....	625,049	589,717	5,928,124	10.29	5,126,694	9.95
Pennsylvania.....	593,800	547,061	5,204,132	9.03	4,495,080	8.73
Erie.....	709,400	756,452	6,828,702	11.85	6,059,536	11.77
Ont. & Western.....	212,951	211,435	2,132,259	3.70	1,834,518	3.56
Total.....	6,338,194	6,665,321	57,620,079	100.00	51,500,540	100.00

Stocks at Tide on Oct. 31 were 603,223 tons as compared with 577,805 tons on Sept. 30.

LAKE SHIPMENTS

Anthracite Shipments through the Sault canals for the current year to Oct. 1 were 2,110,934 tons as compared with 1,321,452 tons for the same period last year.

Bituminous Shipments for the same periods were 12,610,557 for the current year as compared with 9,544,129 in 1912, making gross of 14,721,491 for 1913 and 10,865,581 in 1912.

NORFOLK & WESTERN

The following is a statement of the tonnage shipped over this road during September, 1913, and for the nine months ending Sept. 30, as compared with corresponding periods of 1912 in short tons:

	1912	1913	1912	1913
Coal				
Tidewater, foreign.....	68,672	107,814	1,094,529	1,236,387
Tidewater, coastwise.....	331,489	295,402	2,768,700	2,892,968
Domestic.....	1,528,376	1,706,260	13,245,863	13,805,544
Coke				
Tidewater, foreign.....	.....	.....	52,762	27,189
Domestic.....	113,035	121,451	1,014,174	1,153,761
Total.....	2,041,572	2,230,927	18,176,028	19,115,859

COAL FREIGHT DECISIONS

I. C. C. No. 4652—Lebanon (Kentucky) Commercial Club vs. Louisville & Nashville R.R. Co., et al.

Local rates for the transportation of bituminous coal in carloads from mines located on the Louisville & Nashville R.R. in Virginia and Tennessee to Louisville, Ky., are less than to Lebanon, Ky., an intermediate local point 67 miles nearer to the mines than is Louisville, and vary according to the grade of the coal, while the rates to Lebanon are not so varied; **Held:**

That as the rates to Louisville are influenced largely by the movement of bituminous coal by the Ohio River and by competing rail carriers, the lower and varied rates to that point have not been shown to be unjustly discriminatory as against Lebanon.—**Opinion No. 2432.**

FOREIGN MARKETS

GREAT BRITAIN

Oct. 31—The demand for practically all classes of large and small coals continues active and admiralty list coals particularly are difficult to secure for early positions. Tonnage is being delayed by stormy weather but the docks are fairly well supplied with ready vessels. Outputs are improving somewhat, although still below normal. Quotations are approximately as follows:

Best Welsh steam.....	$4.80@4.92	Best Monmouthshires..	$3.96@4.08
Best seconds.....	4.56@4.68	Seconds.....	3.72@3.90
Seconds.....	4.32@4.44	Best Cardiff smalls	2.52@2.64
Best dry coals.....	4.32@4.56	Seconds.....	2.34@2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

AUSTRIA

Coal exports for the first half of the current year amounted to 2,307,998 tons as compared with 2,218,602 for the same period last year. Exports to the United States for the same periods were, 42,229 and 46,474 respectively; to Canada 15,256 against 17,520 in 1912 and to the Philippines 18,692 and 43,189 respectively.

SPANISH IMPORTS

Coal imports into Spain for the eight months to Aug. 31 of the current year were 1,818,354 metric tons, compared with 1,486,111 tons for the same period last year. Coke imports for this period of the current year were 239,507 tons as compared with 242,355 tons for the same period last year.

Martinique (French West Indies)—Total coal imports into this port in 1912 amounted to 392,628 tons of which the United States furnished 376,734 tons.

Australia—A notable feature of Newcastle trade last year was the large increase in the quantity of coal exported to places beyond the State, the total being 5,030,308 tons, valued at $12,739,006 in 1912 as compared with 4,061,780 tons, valued at $10,301,981 in 1911.

In the foreign markets a slump may occur at any time, to the loss of the shippers; even where contracts have been entered into, the increase in freights may destroy the profits. That was the case in respect to the coal sent to some foreign markets during the last six or eight months. Freight rose to such a figure that even coal of a good quality realized only 75c. or $1 a ton after all charges were met. At these figures the companies lost on every ton handled.

Among foreign consumers of Newcastle coal Chile easily stands first and during 1912 took a very large quantity. Coal was also placed in other markets, and a fair quantity went to the East. However, in the latter field freights are a big handicap, as Japanese vessels are able to take coal to Manila, Singapore, and other Indian ports and get return cargo. Until rates are more favorable, the prospects are not good for placing a great quantity of coal in the Eastern markets.

Exports to the United States fell of sharply to 129,252 tons in 1912 as compared with 203,128 tons during 1911.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Nov. 8:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products.....	..	..	80	87	80
American Coal Products Pref.....	..	..	105	109½	102
Colorado Fuel & Iron.....	29⅛	27⅜	27⅜	41¼	24⅛
Colorado Fuel & Iron Pref.....	....	....	155	155	150
Consolidation Coal of Maryland.....	....	....	102½	102½	102½
Lehigh Valley Coal Sales.....	225	210	215	....	....
Island Creek Coal Com.....	48⅛	47	47½	53⅜	47
Island Creek Coal Pref.....	84	83½	83½	85	80
Pittsburgh Coal.....	20	20	20	24⅜	14½
Pittsburgh Coal Pref.....	89⅜	89⅛	89⅛	95	73
Pond Creek.....	18⅜	18	18	23⅜	16½
Reading.....	161¼	158⅜	159	171	151⅜
Reading 1st Pref.....	84	84	84	92½	82½
Reading 2nd Pref.....	86	85	85	95	84
Virginia Iron, Coal & Coke.....	42½	40½	40½	54	37

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s.....	93	95	93½	93½	93½	99½
Colo. F. & I. gen. 6s.....	104	106½	107½	June '12	..	..
Col. Ind. 1st & coll. 5s. gu.....	78	80½	79⅜	Oct. '13	77½	85
Cons. Ind. Coal Me. 1st 5s.....	78	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s.....	..	88⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s.....	..	..	102⅜	April '06	..	..
K. & H. C. & C. 1st s f g 5s.....	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s.....	..	86	86	Oct. '13	85	87½
St. L. Rky. Mt. & Pac. 1st 5s.....	78	79½	78	Oct. '13	73	80½
Tenn. Coal gen. 5s.....	..	98⅛	97⅜	Oct. '13	97⅜	103
Birm. Div. 1st consol. 6s.....	100½	101½	100½	Oct. '13	100⅛	103
Tenn. Div. 1st g 6s.....	100⅛	102½	100⅛	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s.....	..	..	103	July '13	103	103
Utah Fuel 1st g 5s.....	..	..	..	..	..	..
Victor Fuel 1st s f 5s.....	..	80	80	May '13	79⅜	80
Va. I. Coal & Coke 1st g 5s.....	92½	94	93	Oct. '13	92	98

No important dividends were announced during the week.

FINANCIAL DEPARTMENT

Nova Scotia Steel & Coal Co.

President Robert E. Harris reports for the year 1912 as follows:

Results—The depression in the United States also depressed the price of and restricted the market for our ore in that country. Another difficulty was the great coal strike in Great Britain, during the spring of 1912, which closed down for several months a large proportion of the blast furnaces of that country, with the result that our market there for Wabana ore was practically cut off for the balance of the year.

In view of these adverse conditions, we may congratulate ourselves upon the fact that our profits were as large as they were, namely, $1,000,610 [contrasting with $1,019,392 in 1911], while, after paying our usual dividends of 8% on the preferred and 6% on the common shares, we carried $452,601 to profit and loss, which is only $56,000 less than in 1911.

Additions—During 1912 we made further large expenditures [aggregating $1,279,569] in improving our plant and developing our resources. We contemplate further expenditures along the current year in opening up a new colliery at Sydney Mines, further developments at Wabana and some improvements and additions to plant, which would give a further increase in outputs and from which we are warranted in expenditure made on capital account in 1912 and the contemplated expenditure of the present year, we have since the beginning of this present year disposed of $2,000,000 treasury debenture stock.

Eight Years' Record—In March, 1905, the board elected me as president. A comparison of some figures for 1904 may prove interesting.

1. Capital, etc.	Stock, Bonds, etc.	Profits	Employees	Wages	Per Man
1904	$9,859,800	$501,337	3,449	$1,609,754	$467
1912	14,000,000	1,000,609	5,600	3,192,498	570
Increase	42%	100%	62%	100%	22%
2. Output (in Tons)	Ore Mined	Coal Mined	Pig Iron	Ingots	Forged, etc
1904	246,022	476,521	31,567	30,000	25,958
1912	533,000	841,528	68,784	77,940	71,284
Increase	116%	76%	118%	160%	175%

[Royalty paid in 1912 to Govt. of Nova Scotia on coal mined, $76,128.]

	Output of Calendar Years (in Tons). Coal	Wab. Ore	Coke	Pig Iron	Steel Ing.	Steel Bill.	Bars, etc.
1912	841,528	555,000	85,334	68,784	77,940	71,284	(?)
1911	780,468	521,011	97,580	84,497	83,718	78,004	(?)
1910	847,176	532,058	90,360	65,484	73,019	59,244	50,915
1909	809,341	460,387	87,816	58,676	64,240	52,931	45,090

RESULTS FOR CALENDAR YEARS

	1912	1911	1910	1909
Profits for the year	$1,000,610	$1,019,392	$1,140,504	$799,978
Government bounties *a*	.....	.....	.....	107,971
Total profits	$1,000,610	$1,019,392	$1,140,504	$907,949
Balance brought forward	508,545	500,603	336,807	1,219,221
Deduct 20% stock div. Declared Dec. 1909	.....	.....	.....	1,000,000
Total available	$1,509,155	$1,519,995	$1,477,311	$1,127,170
Deduct				
Interest on bonds, etc.	$352,311	$291,169	$248,000	$247,837
Int. on debenture stock	60,000	60,000	60,000	30,000
Depreciation; renewals	92,196	96,124	79,371	77,669
Div. on pref. stock (8%)	82,400	82,400	82,400	82,400
Div. on common stock	(6) 360,000	(6) 360,000	(4½) 270,000	(1) 60,000
Disc., etc., on bds. issued	.....	.....	218,103	*b*184,453
Improvements and betterments	61,010	73,881		52,174
Sinking fund and misc.	48,637	47,876	18,834	55,830
Total	$1,056,554	$1,011,450	$976,708	$790,363
Surplus carried forward	$452,601	$508,545	$500,603	$336,807

a Under the Act of April 27, 1907 the Government bounties expire in 1910.
b Commissions and premiums on converting bond issues written off.

BALANCE SHEET DECEMBER 31

Assets—	1912	1911	1910	1909
Property and mines	$15,670,624	$14,489,286	$13,490,554	$12,582,191
Inventories	1,714,184	1,338,128	1,245,682	1,124,259
Ledger accounts and bills rec.	907,485	590,543	606,857	662,280
Cash	328,594	397,289	498,788	207,029
Total	$18,620,877	$16,815,247	$15,841,881	$14,585,759
Liabilities—				
Preferred stock	$1,030,000	$1,030,000	$1,030,000	$1,030,000
Common stock	6,000,000	6,000,000	6,000,000	6,000,000
Bonds	5,946,809	4,933,900	4,960,000	3,500,000
Sinking fund	53,556	26,101	.....	607,459
Debenture stock	1,000,000	1,000,000	1,000,000	1,000,000
General reserve	750,000	750,000	750,000	750,000
Bills payable	490,000	775,000	.....	.....
Pay-rolls and accounts not due	534,020	440,691	304,597	193,551
Funds at cred. East. Car Co., Ltd.	971,599	.....	.....	.....
Coupons (January)	148,670	123,347	124,000	87,500
Coupons not presented	1,529	1,540	843	.....
Deb. stock int. Jan. 1	30,000	30,000	30,000	30,000
Div. on pref. Jan. 15	20,600	20,600	20,600	20,600
Div. on common Jan. 15	90,000	90,000	75,000	60,000
Res've for depr., etc.	1,029,270	1,023,332	994,624	924,562
Insurance funds	72,223	62,191	51,614	45,280
Profit and loss	452,601	508,545	500,603	336,807
Total	$18,620,877	$16,815,247	$15,841,881	$14,585,759

Pocahontas Coal & Coke Co.

The 17th annual report of the N. & W. Ry. embodies the following, re the Pocahontas Coal & Coke:

The production of coal during the year from lands leased to mining companies by the Pocahontas Coal & Coke Co., aggregated 12,244,736 net tons, an increase of 954,697 tons or 8.46% over the preceding year. About 91,139 tons were consumed at the mines and 1,171,887 tons were converted into coke. From these lands, your company received for shipment 9,953,252 net tons of revenue coal, 725,765 tons of revenue coke and 1,004,424 tons of coal for its fuel supply. From other lands on your Company's lines, it received for shipment 10,535,786 net tons of revenue coal, 842,283 tons of revenue coke and 1,722,895 tons of coal for its fuel supply.

The sinking fund, provided for in the Pocahontas Coal & Coke Co.'s Purchase Money First Mortgage, dated Dec. 2, 1901, amounted in the calendar year 1912 to $266,627.06. Through this and other sums paid to the Trustee under the terms of the mortgage, bonds aggregating $302,000 were purchased and canceled. From the beginning of its operation in 1906 to date, the sinking fund has received from royalties on coal mined the sum of $1,425,798.71 and from sales of lands the sum of $124,800.52, a total of $1,550,599.23; by means of which there have been purchased and retired bonds to the aggregate amount of $1,716,000, reducing the outstanding bonds to $18,284,000, and leaving a cash balance of $847.48 in the sinking fund.

The income of the Pocahontas Coal & Coke Co., after providing for the mortgage sinking fund, was insufficient for the payment of the interest on its mortgage bonds. The deficiency was advanced by your company and the Pennsylvania Lines West of Pittsburgh, your company's share, two-thirds, or $92,999, being charged to income.

The work of unifying the company's properties, completing its titles and surveying, monumenting and mapping its lands has made further substantial progress. Your company has advanced to the Pocahontas Coal & Coke Co. for these purposes the further sum of $20,000, making a total to date of $1,292,000 charged in your company's accounts as advances to that company for property expenditures.

Colorado Fuel & Iron Co.—The additions made during last year's operations brought the gross working capital of this company up to $19,130,000, which is equal to more than half of the entire outstanding capital stock. In spite of the encouraging progress the company has been making, however, it must be remembered that the $14,000,000 five per cent. 10-year convertible debentures owned by the Colorado Industrial Co. matured in August, 1911, and are now overdue.

Susquehanna Coal Co.—In view of the fact that this company paid its first dividends last year, it would seem that the Pennsylvania R.R. would have ample cause for wishing to dispose of such an unprofitable investment. The disbursements amounted to only $85,472 or 4% on the $2,136,800 stock all of which is owned by the railroad company. In 1908 and 1909 interest payments amounting to $360,000 or about 6% on the investment were made each year. This fell off to $240,000 in 1910, but increased again to $300,000 in the two succeeding years.